AUSTRALIAN STEEL ASSOCIATION INC.
A0020339V ABN 24 762 435 928

PO Box 305, Burwood, Victoria, Australia 3125
Office: Suite 307/737 Burwood Rd., Hawthorn East Vic. 3123
Telephone: +61 3 9882 1652 Mobile: +61 426 268 432
E-mail: dbirrell@steelaus.com.au Web: www.steelaus.com.au

PUBLIC FILE 57

Date: 5th March 2012

Mr Geoffrey Gleeson,
Director
International Trade Remedies Branch
Australian Customs and Border Protection Service
5 Constitution Avenue
CANBERRA ACT 2601

Dear Mr Gleeson,

Submission - Public File Version

HSS Exported from China, Korea, Malaysia, Taiwan and Thailand – Investigation no 177
Australian Steel Association Submission – Route to Market, Onesteel ATM Application, Custom's Onesteel ATM Visit Report & Like Goods.

Please find attached the Australian Steel Association Inc submission in response to Onesteel ATM's allegation of dumping and subsidisation of HSS - Investigation No 177.

This initial submission respond to claims made in the Application by addressing issues & commenting on:

- Route to Market
- Onesteel ATM's Application
- Custom's One Steel ATM Visit Report
- The issue of claimed 'Like Goods'

Formal responses on pricing and material injury will be provided in subsequent submissions.

Yours Sincerely

David Birrell

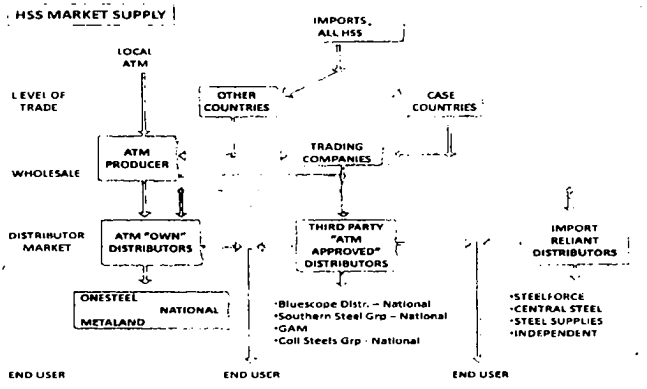
Chief Executive Officer
Australian Steel Association Inc
Suite 307 / 737 Burwood Rd
Hawthorn East Vic 3123
Ph: 98821652
Mob: 0426 268432
Email: dbirrell@steelaus.com.au

AUSTRALIAN STEEL ASSOCIATION INC.
A0020339V
ABN 24 762 435 928

1. HSS Route to Market

The Australian HSS Market is structured as follows:

Fig 1: Australian HSS Market Structure



The market structure in Figure 1 reflects the changes in the market since prior HSS cases and accounts for the 'significant sources of supply from Japan, South Africa and Vietnam' as noted by AC&BPS[1]

Key points from the Industry Structure include:

1.1. Approximately 90% of HSS is sold in Australia via the distributor market.

1.2. The domestic distributor market is dominated by two vertically integrated steel producers, OneSteel and BlueScope, each a monopoly in their respective sectors. For HSS, whilst OneSteel and BlueScope are seen to be competitors at the distribution level, they are also customers and suppliers of each other.

1.2.1. BlueScope supplies OneSteel-ATM with HRC to manufacture HSS;
1.2.2. OneSteel-ATM supplies BlueScope Distribution with HSS;
1.2.3. Both supply each other's distribution networks with other steel products; and
1.2.4. In addition, both import HSS and other steel products.

[1] HSS Investigation 177:Customs Onesteel ATM Visit Report, page 21 para 2

Telephone/Facsimile: +61 3 9882 1652 Mobile: 0426 268 432 E-mail: dbirrell@steelaus.com.au

1.3. HSS is produced in Australia by three companies, OneSteel-ATM, Orrcon and Independent Tube Mills ("ITM").

1.3.1. OneSteel-ATM does not sell to each and every Australian purchaser of HSS. Apart from its own OneSteel distribution network and BlueScope distribution, direct sales are constrained to select third party distributors such as Southern Steel Group and Coil Steels Group.

1.3.2. Orrcon sells to its own vertically integrated distribution network and franchise distributors. Orrcon will sell to other independent distributors on application.

1.3.3. ITM does not have a vertical integrated distribution network and supplies independent distributors. Prior to entry of ITM in August 2010, the majority of independent distributors could only source HSS from imported supply. However ITM's capacity is limited and imported supply remains the only available source of direct supply for many of Australia's downstream manufacturers and steel users.

1.4. Imported HSS is sourced from various Asian mills as an internationally produced commodity. Countries to export HSS to Australia can be classified into two groups:-

1.4.1. Countries under investigation (China, Korea, Malaysia, Taiwan and Thailand); and
1.4.2. Other countries [redacted]**Other Countries]**

[redacted]

[2] OneSteel ATM application for Dumping Duties; page 16; Note 4
[3] [redacted]
[4] HSS Investigation 177:Customs OneSteel ATM Visit Report, page 24 para 3

Telephone/Facsimile: +61 3 9882 1652 Mobile: 0426 268 432 E-mail: dbirrell@steelaus.com.au

[redacted] **[Onesteel other country import commentary]**

1.6. BlueScope import direct from the countries under investigation, however we understand they also source from other countries via OneSteel.

1.7. Orrcon import direct from the countries under investigation.

1.8. Majority of balance of imports are sourced via the wholesale level of trading companies, who have a supply channel with an overseas mill and bundle orders from their distributor and end-user customers. Trading companies import HSS from both groups of countries.

ASA Recommendations:

ASA Recommendation 1 –

[redacted] **[ASA Recommendation1]**

ASA Recommendation 2 –

[redacted]

[ASA Recommendation 2]

ASA Recommendation 3-

[redacted] **[ASA Recommendation 3]**

Telephone/Facsimile: +61 3 9882 1652 Mobile: 0426 268 432 E-mail: dbirrell@steelaus.com.au

2. Application Errors and Misrepresentations

2.1. This paper responds to claims made in Part A of the OneSteel Australian Tubemills Pty Ltds Application for Anti-Dumping Duties for Certain Hollow Structural Sections exported from China, Korea, Malaysia, Taiwan & Thailand.

2.2. In particular this paper seeks to redress the following claims made:

2.2.1. That goods under consideration are 'like goods' to those manufactured in Australia.
2.2.2. That the Australian industry continues to commercially manufacture some of the goods under consideration when this is not the case.
2.2.3. Highlight the key factors that have influenced the change in ATM's sales such as declining export competitiveness, a new market entrant and an increase in imports from countries that **are not** the subject of this investigation. This of course debunks any claim of causal link and material injury.
2.2.4. The simplistic claim that imports compete solely on price without acknowledging the wider range of products offered and the streamlined distribution channels [redacted] **[distribution channel strategy]**
2.2.5. Numerous inaccuracies in the data upon which the allegations of dumping are based.
2.2.6. The inference that OneSteel or its related entities do not import from the countries under investigation.

2.3. The intent of this paper is to draw attention to these anomalies so that inaccurate claims can be acknowledged and addressed and to correct the basis of investigation of some of the matters raised.

Representations & ASA Responses:

2.4. **Representation 1:** OneSteel ATM manufactures HSS in painted, black, in line galvanised and hot-dipped galvanised finishes[5].

2.4.1. **Response:** There needs to be a clear understanding of different galvanised finishes. Pre-hot-dipped galvanised product such as ATM's Supagal is a separate product to Post-hot-dipped galvanised product that make up a significant proportion of the goods under investigation.

i.e: they **are not** 'like goods'

A brief comparison of the different galvanised coating types is below:

[5] OneSteel ATM Application for Anti Dumping and Countervailing Duties Ref: A -3 .3: Page 8:

Telephone/Facsimile: +61 3 9882 1652 Mobile: 0426 268 432 E-mail: dbirrell@steelaus.com.au

Supagal	Z100-Z200	Pre-galvanised both sides	AS/NZS 4972 Sect 3
Hot Dipped Galv	**300+g/sqm both** sides	Post Hot Dipped Galvanised	AS/NZS 4972 Sect 2

The clear-cut difference between 'post hot-dipped galvanised' (HDGP) and 'in line galvanised' (ILG) product is perhaps best summarised by the independent expert, the Galvanisers Association of Australia (GAA)[6] :

In regards to ILG "Steel sheet, pipe and wire are continuously galvanised in specially developed galvanising processes...Because of the **different processes** and wide variety of coatings offered, **these products should NOT be confused** with after fabrication **(read hot dipped)** galvanising".

Note: OneSteel ATM do not commercially manufacture HDGP pipe in Australia.

2.5. **Representation 2:** "The Australian industry **continues** to manufacture 'like goods' to imported HSS from China, Korea Malaysia, Taiwan and Thailand"[7].

2.5.1. **Response:** Our understanding is that whilst ATM may 'market' imported product in direct competition to the goods imported from China, Korea, Malaysia, Taiwan & Thailand, a 'significant' proportion of the goods under consideration are not manufactured in Australia. Unilateral changes made by OneSteel ATM since Trade Measures Report No 153 was issued render this comment inaccurate & misleading.

A case in point is HDGP which of itself makes up approximately [redacted] of the goods under consideration.

2.6. **Representation 3:** Product demand was influenced by the general economic downturn over the last quarter of 2008 and the first half of 2009. Following this period, demand improved with imports growing at a much faster rate than Australian industry sales[8].

2.6.1. **Response:** From OneSteel ATM's own Indexed Table of Sales Quantities[9] it can be clearly seen:

Imports	**Total Australian Sales**	**(Alleged) Dumped Imports**	**Other Imports**	**Total**
2008/09 (ref year)	71.67	157.40	350.68	170.52
2010/11 (PUI)	79.37	121.23	515.49	137.10
Change	**+10.7%**	**-23%**	**+47%**	**-19.6%**

From OneSteel ATM's own data the following observations can be made:

[6] GAA 'After Fabrication Hot Dip Galvanizing; page 18'
[7] OneSteel ATM Application for Anti Dumping and Countervailing Duties Ref: A -3 3: Page 9 para 2:
[8] OneSteel ATM Application for Anti Dumping and Countervailing Duties Ref: A-4.2 page 12 para 1:
[9] OneSteel ATM Application for Anti Dumping and Countervailing Duties pages 15-16

- Australian sales grew by 10.7% in the period since the GFC.
- Imports from the countries alleged to have dumped actually declined by 23% during this period.
- 'Other' Imports i.e: those not subject to this investigation, including those countries that OneSteel ATM import from grew by **47%** during this period.
- Despite the surge of imports from countries **not** included in this Application, overall imports declined by 19.6%.

Note: Imports from the Countries under Investigation also decreased during the 2010/11 year[10] (PUI).

The ASA respectfully directs AC&BPS attention to the OneSteel ATM graph 'Australian Steel Imports – 3 month moving totals' detailed at their Operational Site tour on the 2nd of May 2011[11] which not only indicates that imports declined during the period under investigation but for the Market Mills division has also excluded the impact of OneSteel imports.

Reasonable conclusions to be drawn from the above information are profound in the context of this application, namely:

- That the Australian market improved during the PUI which challenges the basis of any claim of material injury.
- That imports from the countries under investigation significantly declined.

i.e: so whilst the increase in sales indicates that there can be no claim of material injury, the decline in imports from the countries under investigation categorically rebuts any suggestion of a causal link to material injury.
i.e: there is **no** material injury and it **certainly is not caused** by imports from the countries that have alleged to have dumped.

[redacted]

[redacted] **[Commentary on Onesteel Table of Sales Quantities]**

2.7. **Representation 4:** There are a number of claims about the basis of how imported product competes[12].

[10] OneSteel Application for Dumping and Countervailing Duties 'Quarterly HSS Import Volumes Graph' : Section A-9 page 25
[11] OneSteel Operational Site Tour 2 May 2011; 'Australian Steel Imports – 3 month moving totals'; page 39
[12] OneSteel Application for Dumping and Countervailing Duties: Ref A-4 2.Page 14. The way in which the imported product and Australian product compete

2.7.1. **Response:** The claims of innovation by the applicant are directly countered by OneSteel ATM's own comments about an "inability to attract investment and re-invest in current production assets" and that "reinvestment in OneSteel ATM's current assets has been postponed, as alternative investment considerations outside the HSS range of products currently represent a better return on capital invested for the OneSteel Group"[13].
Additionally the breadth of range of HSS pipe available by virtue of import alternatives is not acknowledged as a reason for the competitiveness of imported pipe

With regard to marketing and distribution, a more representative example of the channels to market of HSS in Australia is detailed in Figure 1: Australian HSS Market Structure. What Figure 1 indicates is that an efficient streamlined channel to end market users is not served by a distribution to a restricted number of anointed distributors.

The claims of genuine competitive forces amongst the domestic manufacturers are also challenged by a cursory examination of the announced price increases over the period under investigation[14].

From the above factors it could be argued that by virtue of product range, streamlined distribution, along with a fair & competitively based price offering, imported HSS offers the only true form of competition to users of HSS product in Australia's manufacturing industry.

2.8. **Representation 5:** It is OneSteel ATM's submission that current HSS imports from China, Korea, Malaysia, Taiwan, and Thailand are being dumped ... and that the dumping has caused and is continuing to cause, material injury to the Australian HSS industry[15]

2.8.1. **Response:** Specifically considering the claim of material injury:

- Imports from the countries under investigation have decreased by 18 per cent for the year 2010/11, the period under investigation.
- Imports from countries, not subject to this investigation, have increased by over 66% for the same period and a staggering five fold increase since the reference year of 2005/06. Consideration of the drivers of this five fold increase in importing from countries not under investigation would be insightful.

Whilst there is clearly no causal link between the countries under investigation and any allegations of material injury, it should be noted that the initiation of a dumping action against countries whilst selectively importing from countries not affected by the dumping application does potentially cause material injury to the end users of HSS product.

[redacted]

[13] OneSteel Application for Dumping and Countervailing Duties; page 31
[14] OneSteel Operational Site Tour 2 May 2011; pages 18& 38
[15] OneSteel Application for Dumping and Countervailing Duties; Ref A-4.2.Page 15. The way in which the imported product and Australian product compete.
[16] [redacted]

[redacted]

[Response on claims of material injury]

2.9. **Representation 6:** OneSteel ATM does not import from the counties nominated in this application[18].

2.9.1. **Response:** It can be demonstrated that HSS product as described in the Goods Under Consideration is imported from the countries nominated in this application by OneSteel or its related entities[19].

2.10. **Representation 7:** Indexed table of Applicant's Sales Values[20]

2.10.1. **Response:** Attention is drawn to this table for two reasons:

2.10.1.1. Firstly the decline in indexed exports from 98.6 in 2008/09 to 35.7 in 2010/11 signals that macroeconomic factors such as the exchange rate and indeed OneSteel ATM's international competitiveness are more attributable drivers for this decline.

The claimed causal link of material injury to the OneSteel ATM by the alleged dumped imports is not a consideration in this factor

2.10.1.2. The decrease in the applicant's sales volumes, particularly since 2007/08 shows a far stronger correlation with the increase in imported sales volumes from countries that **are not** the subject of this investigation.

Whether these imports are the direct replacement of goods previously manufactured by OneSteel ATM is recommended for consideration by AC&BPS.

2.11. **Representation 8:** "Following the Global Financial Crisis (GFC) there has been a surge in HSS imports from China, Korea, Malaysia, Taiwan and Thailand[21]".

2.11.1. **Response:** As previously indicated, using OneSteel ATM's own Indexed table of Sales Quantities, volumes from the countries mentioned actually **decreased** from an index of 157.4 to 121.23 **(i.e: 23%)** from the 2008-09 year to the period of investigation, 2010-11.

[17] [redacted]

[18] OneSteel Application for Dumping and Countervailing Duties: Ref A-4 .2.Page 16. The way in which the imported product and Australian product compete.

[19] [redacted]

[20] OneSteel Application for Dumping and Countervailing Duties: Ref A-4 .2.Pages 16-17.

[21] OneSteel Application for Dumping and Countervailing Duties: Ref A-8 Injury Page 21

Telephone/Facsimile: +61 3 9882 1652 Mobile: 0426 268 432 E-mail: dbirrell@steelaus.com.au

2.12. **Representation 9:** OneSteel ATM considers that it has experienced material injury for the purpose of this application from the allegedly dumped exports of HSS to Australia from China, Korea, Malaysia, Taiwan and Thailand in 2009/10 following the GFC as imports increased in volume and market share at an accelerated rate when compared with OneSteel ATM's sales[22].

2.12.1. **Response:** The period under investigation is 2010-11 not 2009-10 as indicated in this comment.

Considering each of the countries (using Table B.1.1 on page 42 on the AD Application as the basis):
China: volumes decreased
Korea: volumes decreased
Malaysia: volumes decreased
Taiwan: volumes decreased
Thailand: volumes increased

Collectively there was a 23 per cent decrease in volumes in the period between 2008-09 and the period under investigation (2010 -11).
This contrasts with a 15.4% increase from the countries not subject to this investigation.

This indicates that the allegation of dumping against the nominated countries is misdirected at best. [redacted] **[explanation of changes in the market]**

2.13. **Representation 10:** "In 2006, the Australian HSS Industry made an application for anti-dumping measures ... upon data from the 2005 calendar year.

Throughout 2010 and into 2011, HSS exports to Australia from the same five countries have increased in aggregate **by 60 per cent** (over 2005/06)[23]

2.13.1. **Response:** This claim is not borne out by the data submitted in the application. i.e: it is factually incorrect!

Whilst the graph, 'Quarterly HSS Import Volumes' on page 25 of the application only shows three quarters of the 2010/11 year, the claimed 60 per cent increase over the five year period is not reflected in the graph.

Considering the Indexed Table of Sales Quantities (pages 15-16), a moderate 21.23 per cent increase over the five year period is indicated.

Considering Table B.1.1 2010 Import Volumes (page 42), the 21.2 per cent increase in volumes from the countries under investigation for the five year period between 2005/06 and 2010/11 is confirmed. (i.e: from 151,686 tonnes to 183,884 tonnes)

[22] OneSteel Application for Dumping and Countervailing Duties: Ref A-8 Injury Page 21.
[23] Onesteel Application for Dumping and Countervailing Duties: Ref: A-9 Link between injury and dumped imports page 25

2.14. **Representation 11:** Throughout 2010 and into 2011, HSS exports to Australia from the same five countries have increased in aggregate by **50 per cent** (over 2005/06)[24]

2.14.1. **Response:** Apart from the fact that the 'claimed' increase has changed from 60 per cent to 50 per cent since the previous page of the Application, comments on the inaccuracy of this claim are contained in the previous response.

2.15. **Conclusions:**

In summary, the Australian Steel Association respectfully submits that contrary to the claims made in the Applicant's submission that:

- That all goods subject to Investigation No 177 are not commercially manufactured in Australia.
- This particularly applies to claims of commercial manufacture of post Hot Dipped Galvanised Pipe (HDGP).
- Imports from the countries under investigation declined during the PUI.
- Imports from countries not subject to the investigation increased significantly during the PUI.
- Onesteel or its related entities import from the countries under investigation.
- The contributing factors to Onesteel ATM's changed circumstances are more based on:

  - Macroeconomic factors including an appreciating $AUD,
  - imports from countries not subject to Investigation 177,
  - a new market entrant
  - ATM's own competitiveness.

[24] Onesteel Application for Dumping and Countervailing Duties: Ref: A-9 Link between injury and dumped imports page 26

3. Custom's Visit report to Onesteel ATM 11th – 14th October 2011 & 28th October 2011

3.1 In response to the comments made as part of Custom's Visit report to Onesteel ATM, the Australian Steel Association offers the following comments:

[redacted] **[request for clarification on Onesteel's imports]**

3.3 With regard to available range[25], we note that the provided Product Availability Guide was not the most current and that the decision to cease / mothball HDGP production was made after the more recent Product Availability Guide was produced. Accordingly we contend that references to HDGP still being commercially available are incorrect.
This is dealt with further under 'Like Goods and via Annexures B, C & D.

3.4 We note the separation of downgrade product[26] in Onesteel ATM's CTMS and request that AC&BPS seek further clarification on 'downgrade' and 'second' products; their impacts on CTMS and on average selling prices in the Australian market.

3.5 In light of the significant changes to Onesteel ATM's domestic manufacturing base since the date of submitted Product Guides and more specifically with the cessation of HDGP since the period under investigation, the Australian Steel Association strongly challenge the view that goods produced by the Australian industry are 'like goods' to imported HSS.

[redacted]The AC&BPS' observation[redacted]

[redacted] **[Commentary on AC&BPS observations on imports]**

3.7 We draw attention to ATM's comment[28] that the majority of the CHS market is galvanised and in fact post hot dipped galvanised (HDG finish). This is particularly relevant in that HDG finish is the production process that Onesteel ATM has ceased (mothballed) production of, in finality at Acacia Ridge and previously at Newcastle.
For this reason alone, HDGP should be excluded from the scope the investigation.

3.8 The ASA offer Figure 1 as a more relevant representation of the structure of the Australian HSS market.

[25] AC&BPS Onesteel ATM Visit Report – Investigation No 177: pages 15-16
[26] AC&BPS Onesteel ATM Visit Report – Investigation No 177: page 18
[27] AC&BPS Onesteel ATM Visit Report – Investigation No 177: page 21
[28] AC&BPS Onesteel ATM Visit Report – Investigation No 177: page 25-26

Telephone/Facsimile: +61 3 9882 1652 Mobile: 0426 268 432 E-mail: dbirrell@steelaus.com.au

3.9 We acknowledge AC&BPS comments on page 25 of the Visit Report [redacted]

[redacted]

[Commentary on AC&BPS observations]

3.10 Pricing will be responded to in a separate Submission however ATM's comment that HDG CHS is not based on import parity pricing due to 'import competition being too extensive and the pricing too low for ATM to be able to match'[29] should be considered as a commentary on ATM competitiveness rather than on allegations of dumping.

In light of this comment, the Australian Steel Association would also request that AC&BPS note the subsequent Onesteel ATM claims[30] that it still manufactures HDGP by prospectively sending black pipe to be industrially galvanised will both exacerbate the price disparity to a point of non-comparison, as well as supply a product that is totally unfit for purpose.

3.11 Under 5.4 Isolating Relevant Sales, AC&BPS note that the sales listing includes all sales of products that fall within the 'structural' division of ATM.

ASA Recommendation 4-

[redacted]

[redacted] **[ASA recommendation]**

3.12 We acknowledge and note AC&BPS' comments in the Visit report[31] with regard to :

3.12.1 ATM production that is sold to the ATM's approved customer base and

3.12.2 The differential nature of Onesteel imported HDGP that is almost exclusively channelled to Onesteel distribution businesses.

[redacted]

[29] AC&BPS Onesteel ATM Visit Report - Investigation No 177; page 32
[30] John O'Connor & Associates letter dated 5 December 2011
[31] AC&BPS Onesteel ATM Visit Report – Investigation No 177; page 38

Telephone/Facsimile: +61 3 9882 1652 Mobile: 0426 268 432 E-mail: dbirrell@steelaus.com.au

[redacted]

[commentary on Onesteel supply of product]

4 Like Goods

Extract

4.1 The allegation of dumping by OneSteel ATM in ACDN No 2011/43 makes a number of claims that seek to consider all products that fit under the broad banner of HSS as 'like' goods. This is not the case.

4.2 Some of these changes are due to unilateral decisions of OneSteel ATM to fundamentally change its' manufacturing base in Australia and some are due to the inherently different characteristics of the product.

4.3 There are fundamental differences between Circular Hollow Sections (CHS) and Rectangular Hollow Section (RHS) as detailed below.

4.4 Additionally, approximately [redacted][%] per cent of HSS alleged to be dumped are supplied as Hot Dipped Galvanised Pipe (HDGP), a product that is not manufactured in Australia. Consequently any claims of 'like product' for HDGP are invalid.

4.5 Additionally over [redacted][%] per cent of CHS are supplied in a hot dipped galvanised form.

4.6 The distinct difference between CHS and RHS demonstrated below coupled with the fact that HDGP is not manufactured in Australia renders that the allegations of dumping cannot be applied to the majority of the Goods Under Consideration.

4.7 Accordingly CHS and any HDGP should immediately be withdrawn from the scope of the investigation.

4.8 Additionally the reliance of the allegations on these two inappropriately included product types renders the overall Application questionable at best and potentially misleading and deceptive.

Differences in Product

Below is a summary of the specific reasons why the different products that exist under the banner HSS are **not** like products and the consequences of this for this investigation:

4.9 **Proposition 1:** CHS and RHS are separate categories i.e. are not 'like' goods

4.9.1 Reasoning:

4.9.1.1 **The first reason is that their physical attributes are simply different**.

The clear visual difference with CHS having a circular cross section and RHS having a square / rectangular cross section is not coincidental but rather related to the fundamental differences in each distinct product.

In contrast to CHS, RHS is more suitable for structural and mechanical applications due to its inherent flat surfaces. These make RHS more economical for joining and other fabrication processes. Another distinct functional aspect of RHS profile is that "sections only need to be straight cut when joining to other flat surfaces instead of profile cut & minimal edge protection is required for joining and welding RHS"[32].

4.9.1.2 The End Use applications of CHS pipe are distinct from RHS / SHS.

The different end use applications are due to a number of factors that make CHS distinctly different and better suited to purpose. In applications such as farm fencing, there is a need for a 'rounded' edge in order to not injure the livestock. Additionally the product has a 'temporary' barrier function as opposed to a 'structural' function.

The other **critical** element is that the economic and environmental conditions of farming require long life galvanised coatings **that are best served by the distinct process of hot dipped galvanising.**

The different functional requirements of CHS and particularly HDGP are evidenced in the end use applications.

Typical CHS applications include; Farm Gates, Sign Posts, temporary Fencing, TV Antennas & pipes for conveying fluids and gases.

RHS applications are for "structural uses in residential, commercial and industrial construction, signage, leisure equipment, road furniture, transport industries, mechanical, heavy engineering, mining and resources, process engineering, material handling and agricultural[33]"

The unique characteristics of CHS as opposed to RHS are best evidenced by a visit to the manufacturers and end users of these products.

4.9.1.3 The third key reason is the different 'performance' requirements of the CHS relative to RHS.

This is reflected in a range of differing performance criteria:

- Different Standards that they need to comply with :

[32] Source ATM Website
[33] Source ATM Website

As mentioned, CHS are historically of a **non structural** nature. Accordingly they are governed by a less stringent standard that reflects this. AS1074 is for "steel tubes and tubular for 'ordinary' service[34].

RHS being structural in application is governed by a separate Standard being AS 1163.

It should be noted however that whilst there is a clear **marketing** strategy by OneSteel to introduce structural requirements to 'ordinary' (CHS) pipe, the traditional end use applications of circular steel pipe for 'ordinary service' is demonstrated by standard AS/NZS 1074 that draws heavily on the **universal** circular pipe standard BS1387.

- Different Product Names:

Reflecting the different end use requirements, RHS tends to have the higher specification mechanical properties reflected in the product name. e.g: **RHS C450PLUS™**

4.10 **Proposition 2:** Post Hot Dipped Galvanised Coatings (which are not manufactured in Australia) are fundamentally different and hence should be excluded from the AD investigation. This is particularly relevant for CHS supplied in a hot dipped galvanised form.

4.10.1 Reasoning: Different Coating Processes:

The different coating processes used are particularly **critical** in the HSS case. The different performance requirements for CHS vs RHS/SHS is reflected in the different coating systems used:

Name	Product	Process	Performance (refer below)
Duragal	Z100g/sqm on 1 side only	In Line Galvanising (ILG)	AS/NZS 4972
Galtube Plus	Z100g/sqm on 1 side only	Galv outside, painted inside	
Supagal	Z100-Z200	Pre- galvanised both sides	AS/NZS 4972 Sect 3
Hot Dipped Galv	**300**+g/sqm **both** sides	Post Hot Dipped Galvanised (HDGP)	AS/NZS 4972 Sect 2

The clear-cut difference between HDGP and ILG product is perhaps best summarised by the independent expert, the Galvanisers Association of Australia (GAA):

"Steel sheet, pipe and wire are continuously galvanised in specially developed galvanising processes ... Because of the **different processes** and wide variety of coatings offered, **these products should NOT be confused** with after fabrication **(read hot dipped)** galvanising".

[34] Source ATM Website

We note in the recent John O'Connor submission[35] that despite OneSteel ATM previously 'mothballing' Newcastle in 2007/2008 and Acacia Ridge in August 2011 including the loss of their technically qualified operators, OneSteel ATM suggest that HDGP is still commercially manufactured in Australia.

Whilst the contention that OneSteel's nominal HDGP offer constitutes a genuine market offer is addressed in Annexure B, what is significant for 'Like Goods' purposes is that:

- a drained surface finish as opposed to air blown removal of excess zinc
- the removal of requisite post galvanising straightening
- removal of necessary alternate end finishes

further accentuates the discordance of physical attributes between what OneSteel ATM seek to deem suitable and what the market requires (as fulfilled by imported HDGP) for CHS.

Consequences & Recommendations

4.11 The relevance of the above is significant in the context of this investigation:

4.11.1 Firstly approximately [%]of imported HSS is HDGP.
4.11.2 HDGP **is not manufactured** in Australia.
4.11.3 HDGP is imported under exclusive arrangements by OneSteel ATM by countries excluded from this Application.

[redacted]

[implications of Onesteel no longer commercially manufacturing HDGP in Australia]

4.12 Secondly, as greater than [%]per cent of HDGP is in the form of CHS, the impact of there being No Like product for HDGP manufactured in Australia, and the unique & distinct characteristics of CHS indicated above, the integrity of claims made against CHS, particularly of a numerical nature, are unable to be substantiated and hence should also be excised from consideration for the purposes of this investigation.

[35] John O'Connor & Associates letter dated 5 December 2011

4.13 Furthermore as much of the allegations made are reliant on product that can be demonstrated to not be manufactured in Australia i.e: no like product, it should be argued that the basis of this application for 'anti-dumping duties on certain hollow structural sections' is fundamentally and irrevocably compromised and hence should be withdrawn forthwith.

Telephone/Facsimile: +61 3 9882 1652 Mobile: 0426 268 432 E-mail: dbirrell@steelaus.com.au

Annexure A: Onesteel Imports [redacted]

[Onesteel imports]

Telephone/Facsimile: +61 3 9882 1652 Mobile: 0426 268 432 E-mail: dbirrell@steelaus.com.au

Annexure B: Response to Assertion that HDGP is manufactured in Australia.

In the letter dated 5 December 2011, Mr John O'Connor has made the assertion that despite the closure of the Acacia Ridge HDGP facility in August 2011 that followed the closure of the Newcastle facility in 2007/08, that Onesteel ATM still manufacture HDGP in Australia.

There appears to be two components to this claim:

The first is that product such as Duragal is allegedly fit for purpose for HDGP uses. Mr O'Connor has attributed the failure of Duragal to secure any reasonable market share over a 10 to 15 year period to price reasons alone. This is despite the fact Duragal should be a significantly lower cost product to produce given its relatively low levels of single sided zinc coating.

What is omitted is:

- That Duragal was never designed as a substitute for HDGP but rather as an improvement on 'black' HSS. 'Silver for the price of Steel'was the initial marketing campaign'.

  In the 'Duragal for the Price of Silver' brochure the comment is made that **"in many cases, such as internal or non corrosive environments, Duragal may not even require painting at all"**[36]
  It reasonably follows that in many non corrosive environments Duragal will require painting.

  Post hot dipped galvanised pipe by contrast is suitable, without post treatment (painting), in non corrosive and corrosive environments.

- This is reinforced in the Technical Information Duragal Easy Painting & Corrosion Protection Guide on page 8 where it states "the thin even zinc coating on Duragal makes it an **entirely different product** to weld than batch hot dipped galvanized steel[37]

- The 'Substitution Table' between Duragal and Uncoated black steel in the Duragal Technical Information Sheet[38] reaffirms that Duragal is actually a substitute for painted black pipe.
  Note: There is no comparison or substitution table for Duragal and HDGP.

- The unsuitability of Duragal in the environments indicated, the extensive limitation on uses such as animal husbandry, where fertilizers are used etc and the requirements for subsequent post painting and end sealing protection further accentuate differences between Duragal and HDGP.

[36] Annexure C: 'Duragal RHS: Silver for the Price of Steel' brochure
[37] Annexure D: Technical Information Duragal Easy Painting & Corrosion Protection Guide; page 8
[38] Annexure D: Technical Information Duragal Easy Painting & Corrosion Protection Guide; pages 17-21

Telephone/Facsimile: +61 3 9882 1652 Mobile: 0426 268 432 E-mail: dbirrell@steelaus.com.au

- The vast differences in product attributes, method of manufacture, performance requirements, coating types, welding characteristics, nomenclature, ability to be fabricated and end uses etc make Duragal not fit for purpose in HDGP applications. These are dealt with in detail under 'Like Products'.

In short, Duragal does not have product attributes to be considered a functional substitute for HDGP.

[redacted]

[39] HSS Investigation 177:Customs Onesteel ATM Visit Report, page 25
[40] HSS Investigation 177:Customs Onesteel ATM Visit Report, page 33

[redacted]

[41] HSS Investigation 177:Customs Onesteel ATM Visit Report, page 32

Telephone/Facsimile: +61 3 9882 1652 Mobile: 0426 268 432 E-mail: dbirrell@steelaus.com.au

[redacted] **[Commercial example given Onesteel ATM HDGP offer]**

Annexure C:

Refer: 'Duragal RHS: Silver for the Price of Steel' brochure

Annexure D:

Refer: Technical Information Duragal Easy Painting & Corrosion Protection Guide; pages 8 and 17-21

Telephone/Facsimile: +61 3 9882 1652 Mobile: 0426 268 432 E-mail: dbirrell@steelaus.com.au

Annexure C: 'Duragal RHS: Silver for the Price of Steel' brochure

AUSTRALIAN STEEL ASSOCIATION INC.
A0020339V
ABN 24 762 435 928

DURAGAL®

Designed to Trim Your Costs

DuraGal® DualGrade® RHS, manufactured in Australia by OneSteel Market Mills, has become the material of choice in a wide range of applications in the building & construction, engineering, fencing, rural, transport and resource markets.

Available in a large range of popular sizes and thicknesses, the superior benefits of higher strength and the DuraGal® surface finish are designed to help trim your costs.

High Strength

DuraGal® DualGrade RHS is manufactured to comply with AS 1163, and meets the requirements of both Grade C350L0 and Grade C450L0, giving you the benefits of the higher strength of Grade C450L0 while maintaining ease of fabrication.

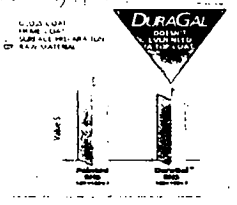
In many applications, DuraGal® allows you to take advantage of the higher mechanical properties and design with a lighter wall thickness, reducing the cost and making handling easier.

DuraGal® is easy to weld with standard consumables. (Refer to the DuraGal® Easy Welding Guide for more information at www.onesteel.com)

DuraGal® Surface

DuraGal® DualGrade® RHS features an In-line Hot-dip Galvanized surface finish, and complies with AS/NZS 4792: HDG100.

The DuraGal® process, pioneered and developed in Australia by OneSteel Market Mills, provides a smooth and uniform galvanized coating that can practically eliminate the costs incurred by shot blasting and cleaning. In many cases, such as internal or non-corrosive environments DuraGal® may not even require painting at all.



Made in Australia to Australian Standards

Our Commitment to You

OneSteel Market Mills is one of the largest manufacturers of steel hollow sections in Australia, and in today's competitive world, you can be sure that our ongoing commitment to technical research, quality in manufacture and the highest level of customer service will continue to provide innovative solutions.

Why You Should Specify DuraGal® DualGrade® RHS

DuraGal®: Complies with Grades C350L0 and C450L0 of AS 1163: Structural Steel Hollow Sections.

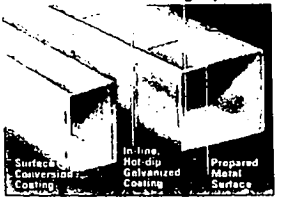
1. Design more economically with stronger and lightweight sections.

2. L0 = impact tested steel suitable for low temperature applications.

3. Consistent quality and dimensional tolerances.

4. Easy to weld, no special heat treatment required, uses readily available welding consumables.

DuraGal® RHS Coating System



Telephone/Facsimile: +61 3 9882 1652 Mobile: 0426 268 432 E-mail: dbirrell@steelaus.com.au

5. DuraGal complies with AS 1163 and meets the material requirements for design to AS 4100: Steel Structures, and other Australian design codes.

DuraGal®: In-Line Hot-dip galvanized coating complies with AS/NZS 4792:ILG100.

6. The prepared surface practically eliminates the costs of shot blasting and cleaning after fabrication.

7. Smooth consistent surface finish means its ready to paint or powder coat.

8. The galvanized coating allows DuraGal® to be used uncoated in many non corrosive applications.

9. 100% uniform galvanized coating. No weld line repair.

DuraGal®: Australian Made, large range, readily available, plus technical support.

10. All DuraGal® RHS is manufactured right here in Australia.

11. The Family of DuraGal® Products® offers the largest range of In Line Galvanized steel sections, DuraGal® CHS, DuraGal® RHS, DuraGal® Profiles (Angles, Channels and Flats).

12. Readily available through an extensive distributor network.

13. DuraGal® is supported by ongoing research, plus technical literature is available from OneSteel Direct or our web site at www.onesteel.com

Size Range

Size d x b	Standard Length (m)	DuraGal® RHS AS 1163:C450L0 Thickness - mm							
		1.6	2.0	2.5	3.0	3.5	4.0	5.0	6.0
150 x 50	8	-	6.07	7.53	8.96	-	11.6	14.2	16.7
125 x 75	8	-	6.07	7.53	8.96	-	11.6	14.2	16.7
100 x 50	8	3.64	4.50	5.56	6.60	7.53	8.49	10.3	12.0
75 x 50	8	3.01	3.72	4.58	5.42	-	6.92	8.35	9.67
75 x 25	8	2.38	2.93	3.60	-	-	-	-	-
65 x 35	8	-	2.93	3.60	4.25	-	-	-	-
50 x 25	8	1.75	2.15	2.62	3.07	-	-	-	-
50 x 20	8	1.63	1.99	2.42	2.83	-	-	-	-
DuraGal® SHS AS 1163:C450L0									
100 x 100	8	-	6.07	7.53	8.96	-	11.6	14.2	16.7
90 x 90	8	-	5.45	6.74	-	-	-	-	-
75 x 75	8	-	4.50	5.56	6.60	7.53	8.49	10.3	12.0
65 x 65	8	3.13	3.88	4.78	5.66	-	7.23	8.75	10.1
50 x 50	8	2.38	2.93	3.60	4.25	-	5.35	6.39	-
40 x 40	8	1.88	2.31	2.82	3.30	-	4.09	-	-
35 x 35	8	1.63	1.99	2.42	2.83	-	-	-	-
30 x 30	8	1.38	1.68	-	-	-	-	-	-
25 x 25	6.5	1.12	1.36	1.64	1.89	-	-	-	-
20 x 20	6.5	0.873	-	-	-	-	-	-	-

kg/m Other thicknesses and lengths subject to enquiry

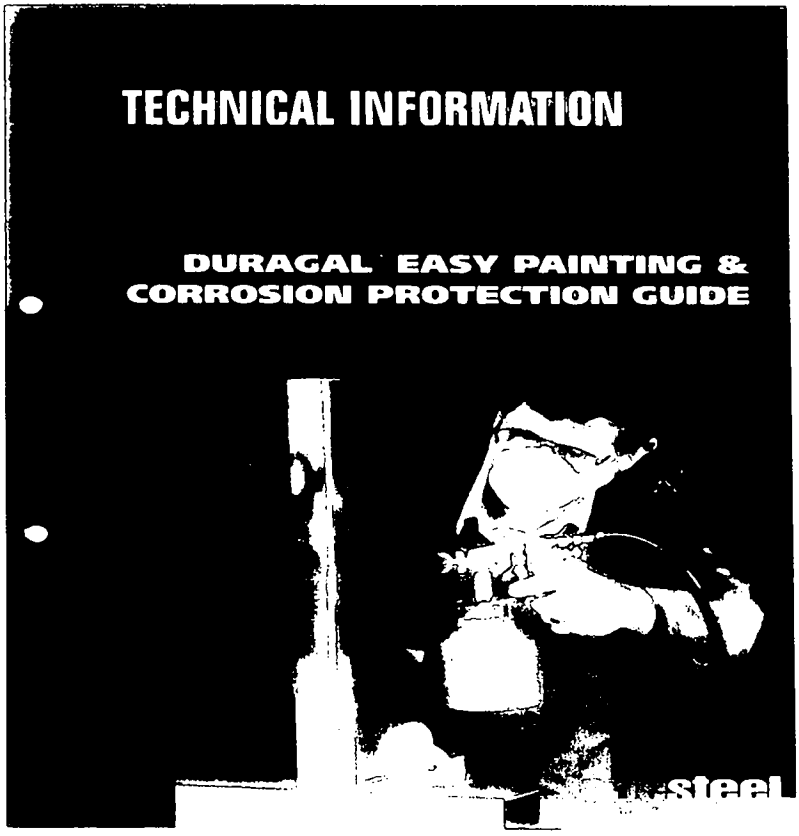
FOR MORE INFORMATION PLEASE CONTACT:

ONESTEEL DIRECT
39-45 Flagstaff Road Port Kembla NSW 2505
Locked Bag 8825 South Coast Mail Centre NSW 2521
Phone: 1800 1 STEEL (1800 1 78335) Fax: 1800 101 141
E-mail: onesteeldirect@onesteel.com
Website: www.onesteel.com

Annexure D:

Technical Information Duragal Easy Painting & Corrosion Protection Guide; pages 8 and 17-21

Refer Attached For Details



Telephone/Facsimile: +61 3 9882 1652 Mobile: 0426 268 432 E-mail: dbirrell@steelaus.com.au

TECHNICAL INFORMATION

DURAGAL® EASY PAINTING & CORROSION PROTECTION GUIDE

DuraGal®

Easy Painting & Corrosion Protection Guide

INDEX

INTRODUCTION

Cost Effective High Tensile Steel Products with a Fully Prepared Surface

DuraGal steel hollow sections have been developed to provide cost effective corrosion resistance, as well as a smooth, easy to use surface finish.

The advantages of the DuraGal prepared surface are now available in a full range of DuraGal cold-formed open profiles - angles, channels and flats. Extending the DuraGal Family of Products®.

Architecturally Decorative Finish which is Kind to the Environment

The steel surface, prepared in a closely controlled factory environment, eliminates or significantly reduces the need for messy open air blasting, chemical, hand or power tool cleaning and its effect on the environment.

DuraGal sections are mechanically cleaned to AS1627.4 Class 3 and then chemically cleaned prior to hot dip galvanising. A zinc coating weight of 100gms/m^2 (14.3 microns) is applied. A surface conversion coating is then applied to help prepare the surface for later painting and to assist prevent white rust during transport and storage. Then, in the case of equal angles (greater than 50 x 50), channels and flats, a clear barrier polymer coat is applied.

Cost Effective

The most cost effective way to use DuraGal products is unpainted, touching up any welds.

The Table on page 7, called "Corrosion life of Unpainted DuraGal in AS/NZS 2312 Atmospheric Environments", indicates which combinations of environment and expected life to first maintenance that unpainted DuraGal can cover. However, if painting is required the result is an even better surface protection.

By teaming the hot dip zinc coating with paint a synergistic effect occurs, ie the corrosion life of the duplex coating system is higher than the sum of the corrosion lives of the zinc and the paint coatings used separately. Research has shown that the increase can be from 1.5 to 2.3 times the sum of the lives of the zinc coating and the paint system, used separately.

When superior corrosion life before first maintenance is required, the DuraGal hot dip galvanized coating will eliminate or considerably reduce the cost of surface preparation and may allow a more cost effective paint coating system to be used, reducing the cost of your project.

The total cost of a product fabricated from a DuraGal profile or hollow section can be considerably less than that of other steel shapes. There can be savings in both the cost of steel and the cost of applying the corrosion resistant coatings. The high tensile DuraGal shapes and hollow sections and their structural advantages can save steel and often dollars.

About This Guide

This guide is designed to cover, in a practical and concise form, paint systems for a wide range of environments, performance levels, pre-treatments and application methods.

On pages 22 to 27 of this guide you will find the recommended coating systems from several leading coatings manufacturers. These coatings manufacturers have carried out their own evaluation for the DuraGal Family of Products® and the exposure categories listed within AS/NZS 2312:1994.

For further information on the coatings listed, OneSteel recommends you contact the coatings manufacturer directly to discuss the details of your application, and obtain detailed data sheets on surface preparation, application and safe use of their products.

OneSteel Direct can assist you by providing the nearest location and contact details for the nominated coatings manufacturers listed in this guide.

Freecall: 1800 065 415
Freefax: 1800 800 744
e-mail: onesteeldirect@onesteel.com

ENVIRONMENTS

Atmospheric Environments

General

The following classifies atmospheric zones in Australia and New Zealand, which affect the corrosion of steel and the life of a coating system.

This information was taken from Section 2 of AS/NZS 2312:1994 (with some additions) and is included in this publication with the permission of Standards Australia.

When selecting an appropriate protective coating system, the overall atmospheric conditions in the location of the intended structure require consideration. A structure situated in an aggressive environment will require a much higher standard of corrosion protection than one in a benign environment. The environment can affect both the steel and the paint system. Of prime importance is the effect the environment has on the corrosion of steel.

The effect the environment has on the life of the paint system is also important. It should be appreciated that corrosive environments described do not necessarily affect coatings in the same way as they affect bare steel. Environments that would not be considered to be particularly corrosive to steel, such as hot dry climates with a high amount of ultraviolet (UV) radiation, can cause early breakdown of some coatings. Tropical environments, with high humidity, rainfall, and which promote mould and fungal growth, are far more aggressive to organic coatings than the corrosion rate would suggest. Furthermore, the colour of the paint may influence its performance in some environments.

In addition to climatic effects, the local environment effects (or microclimate) produced by the erection of a structure or installation of equipment need to be taken into account. Such on-site factors require additional consideration because a mildly corrosive atmosphere can be converted into an aggressive environment by microclimatic effects. A significant acceleration of corrosion rate can occur in the following circumstances:-

(a) At locations where the metal surface remains damp for an extended period, such as where surfaces are not freely drained or are shaded from sunlight.

(b) On unwashed surfaces, ie surfaces exposed to atmospheric contaminants, notably coastal salts, but protected from cleansing rain.

(c) Where the surface is in contact with animal urine or faeces, prolonged intimate contact with very slightly contaminated hay or straw will rapidly remove the zinc coating and initiate rusting.

Other microclimatic effects which may accelerate the corrosion of the substrate or the deterioration of its protective coating include acidic or alkaline fallout, industrial chemicals and solvents, airborne fertilisers and chemicals, prevailing winds which transport contamination, hot or cold surfaces and surfaces exposed to abrasion and impact. These effects can outweigh those of the macroclimatic zones described below.

Microclimatic effects can make it very difficult, if not impossible, to predict accurately the aggressiveness of a given environment and a certain amount of educated judgement is required to assess its influence on the coating life.

Atmospheric Classifications

(a) Mild

A mild environment will corrode mild steel at a rate of up to 10 microns per year and includes all areas remote from the coast, industrial activity and the tropics. Sparsely settled regions such as outback Australia are typical examples, but the category also includes rural communities other than those on the coast. The only areas in New Zealand in this category are sheltered inland areas. Corrosion protection required for this category is minimal.

(b) Moderate

A moderate environment will cause a first year corrosion rate of mild steel of 10 microns to 25 microns and includes areas with light industrial pollution or very light marine influence, or both. Typical areas are suburbs of cities on sheltered bays such as Melbourne, Adelaide and Hobart (except those areas near the coast) and most inland cities. Most of New Zealand, other than sheltered inland areas and areas near the coast, is in this zone.

Corrosion protection requirements are moderate and do not call for special measures.

(c) Tropical

A tropical environment includes coastal areas of north Queensland, Northern Territory, north-west Western Australia, Papua New Guinea and the Pacific Islands, except where directly affected by salt spray. This is the only category that cannot be delineated by the corrosion rate. Although corrosivity is generally low in tropical regions, the aggressiveness of the environment to organic coatings means special protection is required.

(d) Industrial

Industrial environments will cause a first year corrosion rate of mild steel to be greater than 25 microns and can be greater than 50 microns per year. The only areas within this category are around major industrial complexes. There are only a few such regions in Australia and New Zealand, examples of which occur around Port Pirie, Newcastle and the geothermal areas of New Zealand. The pollution in these areas requires that coating systems be resistant to mild acid.

(e) Marine

Marine environments will cause a first year corrosion rate of 25 microns to 50 microns and include areas influenced to a moderate extent by coastal salts. The extent of the area varies considerably depending on factors such as winds, topography and vegetation. For sheltered areas, such as occur around Port Phillip Bay, it extends from about 100m from the beach to about 1km inland, but for most ocean front areas, such as occur along the south-western corner of Western Australia, the south-eastern coast of South Australia, the New South Wales and New Zealand coasts and the surf beach regions of Queensland, it generally extends from about 1km from the coast to about 10km inland and to about 50km inland in exceptional circumstances, depending on the conditions.

Much of Auckland, Wellington, Perth, the Gold Coast, Wollongong, Sydney and Newcastle are in this zone. Significant protection is essential, requiring a high performance coating system to give a long life.

(f) Severe Marine

Severe marine environments have high to very high corrosivity and will cause a one year corrosion rate of steel to be in excess of 50 microns. In Australia and New Zealand, such regions are found off-shore and on the coast. The extent to which such conditions extend inland depends on prevailing winds, extent of wave action and marine surf and land topography, but is generally from the beachfront to about 1km inland along the ocean coast. Around sheltered bays, the region extends inland about 100m. In high wind areas, this region may extend further inland. Special high performance coating systems are required in this region, and it should be recognised that salt deposition during surface preparation or coating applications will cause significant reduction in coating life. As far as possible, structures for these regions should be coated off-site.

Atmospheric classifications (c) and (d) should be considered as additive to the other classifications. Coatings selected for an industrial site in a severe marine environment in the tropics, for example, should be those which are recommended in each classification (c), (d) and (f), as far as possible. Industrial or tropical environments will dominate a moderate or mild environment however, and can be considered by themselves in such cases.

Areas of special corrosivity with high to very high corrosion rates occur underground, underwater, in splash zones and in chemical plants. For these areas, specific protection from the aggressive conditions is essential. The selection of a coating system for any of these conditions is outside the scope of this Guide. Consult your paint company or other expert.

WARNINGS ABOUT ESPECIALLY HARSH CORROSION CONDITIONS

General Warnings

Zinc is very susceptible to acid attack. Even very weak acid solutions will remove the zinc coating from steel very quickly resulting in rust forming after a very short time, often in much less than one year.

Soluble salts such as chlorides, nitrates and sulphates can form acidic salts when wet. The moisture can come from any moisture in the air, ie rain, dew, humidity, etc. In these circumstances suitable painting of the zinc coated product will dramatically increase the length of time before rust appears.

All paints will let small amounts of liquids through to the steel and after time corrosion will result. Generally the more coats and thus the thicker the paint, the longer it takes for rust to appear.

Some paints are better than others at resisting liquid penetration. Advice should be sought from your paint supplier or this company as to which is the best paint for any application that falls outside the cases listed elsewhere in this paint guide or discussed in this section.

Salt, Acid Rain, Farming, Animal Husbandry and Other Corrosion Causes

Soluble salts, such as chlorides, sulphates and nitrates deposited on steel surfaces in combination with moisture, cause accelerated corrosion of steel and zinc coated steel products. These salts are deposited by marine spray, acid rain, chemical spillage, animal urine and faeces, farm chemical over spay, aerial fertiliser and crop dusting over spray, other fallout from industrial and farm operations.

SPECIAL PRECAUTIONS need to be taken to protect steelwork that is exposed to salt contamination and is not frequently washed by rain (or regularly washed clean). Generally using paint systems suitable for protection in severe marine environments will be sufficient (see table 2).

Soluble salts deposited in protected areas combine with moisture, commonly condensation in high humidity environments, to increase corrosion rates through ionic transfer or to form acids that attack the zinc. As mentioned above, accelerated corrosion can occur even if the sections are painted or powder coated.

Corrosion rates in these circumstances can be up to 4 times greater than expected. The failure mechanism requires the salts to be frequently replaced with fresh material and the soluble salt contaminated structural members to be regularly moistened. This includes areas around frequently open doors (and sometimes windows, ie any openings) in generally enclosed structures.

Some specific cases of general and accelerated corrosion contamination are:-

Salt Spray Contamination

- The most commonly known salt contaminant is salt spray from the sea, harbours, estuaries and coastal and inland salt water lakes. Advice on whether the surface being painted will be exposed to a marine or severe marine environment can be found in the "*ATMOSPHERIC CLASSIFICATIONS*" section earlier in this guide.

Steel components that are not regularly washed by rain or hosed down manually, in marine environments, can have an accelerated corrosion rate 4 times greater than normally exposed components. Rain or hosing washes off the soluble salts. For components in these severely corrosive areas always use paint systems recommended in this guide as suitable for severe marine environments (see Table 2).

Some typical areas of buildings that are attacked in this way are: -
- under the eaves.
- the under side of an elevated floor or verandah.
- under awnings, particularly fixed awnings.
- the underside of purlins or framework of verandahs or covered pergolas.
- the inside of open fronted farm machinery sheds.
- any steelwork close to frequently open doors and windows, or other openings.

Accelerated Corrosion of Steelwork in Contact with Animal or Bird Urine and Faeces

Any zinc coated steelwork in contact with animal or bird urine or faeces will need painting. The paint systems recommended in this guide as suitable for severe marine environments will generally be satisfactory (see Table 2).

Even being in contact with straw or wood chip that is used to protect animals from hard floors can result in rapid corrosion. Common practice is to remove soiled and wet straw or woodchips every day, pushing the remaining old litter to the outside of stalls possibly up against galvanized steel framing, and replenishing the litter bed with fresh materials. Failure of the zinc coating can occur in as little as 12 months due to contact with contaminated litter, even though the contamination is not visible.

The need for painting can be eliminated by ensuring that any sections in direct contact with animal waste products are made from corrosion resistant materials. A common way of achieving this is to mount steel sections on concrete nib walls at least 150 mm above direct contact with the urine or faeces.

Accelerated Corrosion of the Inside of Poorly Ventilated Animal or Bird Shelters

Accelerated corrosion can occur in animal or bird sheds where dust or dirt can collect in or on purlins and girts. It is thought that gases and vapours from urine and faeces can form acids or increase corrosion rates through ionic transfer, in the humid atmosphere of closed animal sheds. The atmosphere in the sheds does not have to be highly corrosive at all times to accelerate corrosion.

The paint systems recommended in this guide as suitable for severe marine environments will generally be satisfactory (see Table 2).

Accelerated Corrosion from the Soot from Burning Sugar Cane

A farm machinery shed in Queensland showed red rust, on lightly galvanized sections (50 grams per square metre zinc coating weight), in one season. The paint systems recommended in this guide as suitable for severe marine environments will generally be satisfactory (see Table 2).

Accelerated Corrosion if the Structure is Being Regularly Dowsed with Highly Mineralised Water from Bores or Springs

Powder coated playground equipment showed red rust, in less that one year, at a north western WA sporting oval that was being irrigated every night.

The paint systems recommended in this guide as suitable for severe marine environments will generally be satisfactory (see Table 2).

Accelerated Corrosion of DuraGal Sections in contact with soil or concrete

Contact with moist acidic contaminants of any kind will cause accelerated corrosion of zinc. The point where DuraGal sections enter concrete footings or are below the surface of soil which gets wet at any time are common problem areas.

The moisture that wets the soil might be from animal urine, condensation in humid areas, wind blown spray near the sea or lakes, etc.

This problem is common enough for OneSteel to recommend that all DuraGal product/concrete junctions be painted and a barrier coat be applied to DuraGal Products that will be in contact with soil.

In frequently moist or marine environments use the systems recommended in Table 2 of this guide, for milder areas use those in Table 1.

An alternative to painting is to use epoxy or urethane compounds, tar epoxy substitutes, such as those suggested in the section on the "Protection of Bolts and Bolt Holes" in the "Recommended Paint Systems" section of this guide.

The paint should cover the DuraGal for at least 100 mm above and below the concrete junction. The concrete at the DuraGal/concrete junction should be sloped to encourage any moisture to drain away from the steel member.

To avoid contact with soil, ensure that any footings are at least 50 mm above the soil. In acid soil conditions, If there is any chance that the acid soil can splash up onto the DuraGal, the DuraGal should be painted, as above, anyway.

Chemical Attack

Contact your paint manufacturer for suitable paint systems for these applications.

The paint system needs to be tailored for the precise combination of chemicals and the concentrations used. Only in this way can an effective, yet economical system be recommended

THE CORROSION LIFE OF DURAGAL

Corrosion life of Unpainted DuraGal in AS/NZS 2312 Atmospheric Environments

	Recommended Corrosion Protection System Options		
Atmospheric Classification	**Short Term 2-5 Years**	**Medium Term 5-10 years**	**Long Term 10 - 20 yrs**
Mild	Suitable	Suitable	Suitable
Moderate	Suitable	Suitable	Suitable
Tropical*	Suitable	Suitable	Suitable
Industrial	Unsuitable	Unsuitable	Unsuitable
Marine	Suitable	Unsuitable	Unsuitable
Severe Marine	Unsuitable	Unsuitable	Unsuitable

* Not suitable when affected by salt spray

THE CORROSION LIFE OF DURAGAL

Corrosion Life of Unpainted DuraGal

The most economical way to use DuraGal is unpainted, touching up any welds and black steel attachments.
The corrosion life of unpainted DuraGal products will vary depending upon the exposure conditions. Both general environmental zones and local factors must be considered when evaluating corrosion life.

Some localised factors that can reduce corrosion life are: concentration of industry, fertilisers and insecticides, animal urine and faeces, abrasion or impact, condensation and exposure to wind borne salt (see previous pages for more details).

In Dry Interior and Protected Exterior Environments

These environments are generally less corrosive than the moderate classification in the following tables.

Most environments are only mildly corrosive in the absence of rain, dew, humid conditions or strong liquid chemicals.

Conservatively, an adequate level of corrosion protection will be achieved if DuraGal fabrications are protected to the level set out in the appropriate part of Table 3.

In Wet or Damp Interior Environments

These environments are generally similar to tropical conditions in the following tables. For detailed advice on the coating systems to use see the appropriate part of Table 4.

In Exterior Atmospheric Environments

The table above sets out the corrosion life of unpainted DuraGal when exposed to exterior atmospheric conditions.

Typical Zinc Coating Weight on DuraGal Compared with Other Common Products

To give some guide to the corrosion life that can be expected from DuraGal, it is helpful to compare the typical weight of zinc applied to DuraGal with other common in-line galvanized structural products.

In-line Galvanized and Production Line Products	
DuraGal	100 to 160 g/m^2
Z100 Purlins	45 to 65 g/m^2
Sheeting, etc Z200 Z275	 90 to 120 g/m^2 125 to 165 g/m^2
RHS & Pipe	300 to 600 g/m^2

Batch Galvanized Products (From AS/NZS 4680 Table 1)		
	Section Thickness	Minimum Average Coating Mass
Hot Rolled Steel Structurals, RHS and Pipe	≤ 1.5mm	320 g/m^2
	> 1.5mm ≤ 3 mm	390 g/m^2
	> 3 ≤ 6	500 g/m^2
	≥ 6mm	600 g/m^2

The thin, even hot dip zinc coating on DuraGal makes it an entirely different product to weld than batch hot dip galvanized steel. Normal welding rates are readily achievable. Advice on welding the product is available in the "DuraGal Easy Welding Guide".

Protection of the Bore of DuraGal Hollow Sections

A CIDECT investigation has shown that internal corrosion in hollow sections is not significant when they are sealed at both ends.

CIDECT is a world wide group of tube manufacturers carrying out research into the engineering performance of hollow sections and publishing the results. A series of design guides are available from the AISC.

Good fabrication techniques generally ensure the sealing of the bore of structural hollow sections. If, however, the bore is open to corrosion the bore may need protection and we offer the following suggestions: -

- Flat trapping the ends of the sections to seal off the inside.
- Seal with plugs, and if necessary, a sealing compound.
- Use internally painted DuraGal. Typically 30 microns of Zinc Phosphate primer on an AS 1627.4 class 3 blast. This product is not normally stocked and should be ordered from a mill rolling.
- Coat the bore with a corrosion protectant eg : an anti-corrosive paint; a petroleum based wax; fish oil, etc.

Note ! The above suggestions do not eliminate the need to get "proper design advice" to meet the needs of your particular corrosion environment.

WHITE RUST OR ZINC STORAGE STAIN

Avoiding White Rust or Zinc Storage Stain

DuraGal products, as well as Galtube and Tubeline Hot Dip Galvanized (HDG) are given a protective finish in the form of a zinc conversion coating and/or polymer coatings. One purpose of these coatings is to prevent the formation of white rust during packing, storage and transport.

Avoiding White Rust on DuraGal Channels, Flats and some Angles

DuraGal Profiles, (except for angles up to and including 50mm x 50mm), have been specifically treated to resist white rust by the application of a clear polymer barrier coating, typically 8 microns thick.

This coating is designed to provide packs of DuraGal Profiles with protection from white rust and atmospheric corrosion, in non-marine environments, for a period of 3 months.

If clear coated packs of DuraGal Profiles are to be stored outside for a total of more than 3 months, or if white rust has formed, the advice given below, for DuraGal hollow sections, can generally be followed with just one major modification -

> **Methylated spirits is the only solvent that should be used to clean clear coated DuraGal open Profiles.**

Failure to follow this advice could reduce the adhesion, and thus the corrosion protection, of any additional paint coatings applied to the DuraGal sections.

Any clear coated DuraGal Profile product that has been stored out in the elements, and is going to exceed 3 months open air storage before being used, should be inspected for white rust. If white rust has formed it should be treated, dried and then stored as described in "Preventative Actions".

OneSteel cannot be held responsible for deterioration to galvanized DuraGal Profile products caused by unsuitable storage practices after the product has arrived at the customer's warehouse.

Avoiding White Rust on All DuraGal Hollow Sections and Angles 50mm x 50mm & Smaller

The packed product must be stored under clean, dry and ventilated conditions. This is especially important for smaller size hollow sections, as their physical size and pack configuration restricts natural ventilation.

Storage of packs of galvanized products under covers which restrict ventilation (eg tarps) is not recommended. Changes of temperature from day to night may cause condensation inside the bundles. This condensate will promote the forming of white rust.

Packs of product stored in the open or wet product stored anywhere will develop white rust. OneSteel's quality assurance program ensures that dry first grade product is delivered to Steel Distributors.

OneSteel cannot be held responsible for deterioration to galvanized hollow section products caused by poor transport or storage practices after the product has arrived at the customer's warehouse.

Preventative Actions

If it is necessary to store galvanized sections where they will get wet, either outside or undercover where wind driven rain or spray can enter through a leak, or an opening like a door or window, the product should be arranged so that water will easily run off and all surfaces of the sections are well ventilated. The most common way of achieving this is to stack on non-staining timbers, one end of the stack higher than the other. Each row of galvanized product must be separated by timbers, each item in each row separated by at least 5mm from the next item and open sections stored so that water cannot pool, ie for DuraGal angles, stack with the toes of the profile facing down.

A suitable non-staining timber is seasoned dressed pine. Galvanized sections should never be stored in contact with cardboard or other paper products, cinders, clinkers, unseasoned timbers, treated pine, anything even slightly acidic (pH less than 7) or very strong alkalis (pH greater than 12).

Remedial Treatment

DuraGal RHS packs, and packs of angles 50mm x 50mm and smaller, that become wet should immediately be separated. Each length should have the bulk of any water wiped off, and then be allowed to dry before being stored in a dry place or being stored as recommended in the previous section.

Very light wet storage stains (ie the surface is smooth without significant growth of oxide layer) do not reduce the protective properties of the coating and can be removed by rubbing with a rag soaked in methylated spirits.

Light white rust deposits may be removed by blasting with clean high pressure water, or careful abrasion with soft plastic scouring pads, followed by rinsing with clean water or rubbing with a kerosene or consumer grade rubbing alcohol soaked rag. Only if these methods do not work should steel wool or other harsh metallic scourers be used, as they can significantly reduce the thickness of the zinc coating and thus the corrosion protection provided.

White rust deposits that do not respond to the above methods may be removed by brush blasting, wire brushing or abrasion with a metallic scourer. The dust left on the section should be cleaned off with water or methylated spirits. The original bright, metallic galvanized surface cannot be restored by these treatments and the zinc thickness will probably be significantly reduced.

If the sections are to be painted the white rust can be partially removed by the appropriate method above and then completely removed by chemical treatment. Suggested solutions are 10% acetic acid or proprietary solutions such as Deoxidine 624 by Henkel Australia Pty. Ltd. Henkel recommends a dilute solution of 1 part Deoxidine 624 to 4 parts water.

WARNING !!! The above chemically treated surfaces must be chemically neutralised or rinsed to remove any traces of acid, and then painted immediately, certainly within 4 hours. In particular acetic acid treated surfaces must be carefully rinsed and dried to ensure no soluble salts are left on the surface. Soluble salts reduce paint adhesion.

If removing the white rust reduces the zinc thickness below the specified minimum, the coating can be repaired by application of two coats of zinc rich paint complying with AS2204 to a total thickness of 100 microns. When colour matching is required, Galmet DuraGal Silver paint may be applied over the zinc rich paint.

Warning to Powder Coaters

Bubbling of the coating may occur when trying to powder coat galvanized sections that have had heavy white rust removed.

This can occur at any spot where you can feel surface roughness after the white rust has been removed. There may be a black spot in the bottom of these holes.

This problem can often be overcome by wiping with a weak phosphoric acid solution and then rinsing in clean water and drying before coating.

PAINTING HINTS

SURFACE PREPARATION

A clean, dry surface is essential for satisfactory paint performance.

Degreasing

The preferred method of degreasing is to use aqueous mild alkaline detergent cleaners with high pressure water cleaners, water jetting or scrubbing equipment, followed by water rinsing.

The most common method of degreasing is by solvent washing, followed by wiping dry with clean rags.

Warning ! - Most solvents are not suitable for clear coated profiles. The recommended solvent for all DuraGal products, open profiles and hollow sections, is methylated spirits.

Wiping the tube or profile clean, after solvent washing, is critical. If this is not carried out thoroughly, solvent washing will simply spread any contamination over a wider area. This method is not seen as suitable for large areas (see clause 5.2 of AS/NZS 2312 and AS 1627.1).

Etching The Zinc Surface

If cold phosphating solutions are used, they can damage the zinc coating if left on too long. They should be thoroughly rinsed off with clean water to remove all acidic residues. These preparations are generally not recommended for use on DuraGal.

Note: Clear coated DuraGal Profiles should not be etch primed as this may affect the polymer coat, reducing resistance to corrosion and adhesion of the clear coat to the zinc coating. See table 3 (page 16) for basic primers.

Paint Preparation

Carefully read the Paint Manufacturer's "Instructions for Use" usually found on the paint can label or product data sheet.

Paint should be thoroughly mixed before use; either by paddle stirring or by "boxing" from one can to another. Manual shaking of the can is inadequate.

If thinning is necessary, use no more than the maximum recommended quantity of the Paint Manufacturer's approved solvent. Over thinning is to be avoided as it lowers the solids content of the paint, reduces coating thickness and may produce runs and sags. The above applies particularly to spray application.

Two pack paint systems must be carefully mixed in the ratio specified by the Paint Manufacturer. Minor variations from the recommended component ratio can destroy the effectiveness of the coating.

Painting Conditions

Ideally, painting should be carried out on warm, dry days without frost or heavy dews.
As a general rule paints should not be applied when the temperature of the surface to be painted is below 10°C or above 50°C.

In hot weather painting on the surfaces exposed directly to the sun may result in patchiness or blistering because of rapid loss of solvent.
Painting, particularly of latex paints, should not be carried out in very cold conditions as poor film formation may result.
Conditions of very high humidity (above 85%) can cause "blooming" (whitening) of solvent based paints and poor adhesion of etch primers.

Paint Application

Film thickness for each coat of paint should be as recommended by the Paint Manufacturer.

Excessively thick or thin coats can lead to poor paint performance.

Paint Manufacturers' recommendations regarding drying times between coats should be adhered to.

The heavy zinc powder in zinc rich paints will rapidly settle out and frequent stirring is necessary.

Two pack materials should not be used past the recommended pot life. Also, mixed paint that has exceeded its pot life should not be added to freshly mixed material.

Quick Drying Finishes

The fabricator of steel products often has the need for a quick "dry to handle", one coat paint finish to decorate his product. The following list of Industrial Paints is offered as a basis for discussion with the Paint Manufacturer who can advise on the suitability of particular products.

Very Quick Drying Spraying Enamels

Dry to Handle 20-30 minutes.

Solvent Based Acrylic Clear Coatings

Prevent dulling of the bright DuraGal finish. Quick drying.

Hammer and Textured Finishes

One coat Quick Drying. Camouflage surface imperfections and minor damage.

Very Quick Dry Lacquers

Rapidly develop hard dry surface.

Recommended Paint Systems

The following tables (pages 15 to 22) are Design and substitution tables for painting DuraGal fabrications.

The design tables set out OneSteel's recommended treatment of the DuraGal surface, welds, cut ends, drilled holes.

The substitution tables should be used if you are already painting black steel, the design tables if the substitution tables do not show a substitute for your system, if you are using a paint system over jobbing hot-dip galvanized steel or if you need to select a system for a new project.

If you think your existing system is over specified, using the design tables might be cost effective.

The tables attempt to set out water borne and solvent based systems for both brush and spray application. Economical and effective systems could not be suggested using all water borne and solvent based systems. The recommended systems contained mixed systems where necessary. In particular it was not possible to recommend a water borne system for medium and long term protection of the weld areas of DuraGal fabrications and black attachments.

Corrosion Protection For DuraGal - Powder Coating

DuraGal is a prepared surface suitable for powder coating. See the "DuraGal Powder Coating Manual" for further information.

Painting Fabrications Welded from DuraGal with Black Steel Attachments

Painting the Black Steel Attachments and welds

Black steel has a surface layer of black mill scale (a form of oxide) which promotes rusting of the steel under normal exterior conditions. Painting over mill scale gives only medium term protection at best.

For long term protection it is necessary to shot or grit blast the steel down to a clean bright metal surface free from mill scale before applying the selected paint system.

It is of interest to note that an essential part of the DuraGal zinc coating process is that the steel surface is shot blasted and chemically cleaned to a surface equivalent to AS 1627.4 class 3, before the zinc coating is applied. DuraGal, as received by the user, is therefore a zinc protected, mill scale free steel surface immediately suitable for coating up to the level of Long Term Protection to AS/NZS 2312.

In considering the painting of a DuraGal/Black Steel composite fabrication, the decision regarding the performance required of the black steel component is therefore important.

Where the Black Steel component is a small part of the surface area of the total fabrication, say less than 5%, it may be treated the same as the weld area in a DuraGal to DuraGal fabrication.

If the black steel component is 5% of the total surface area or larger it should shot blast to AS 1627.4 Class $2^1/_2$ and then painted with a system from AS/NZS 2312 suitable for the design level of protection required and, If the DuraGal component of the fabrication is to be painted as well, compatible with the DuraGal paint system selected.

Only if it is not necessary, from a corrosion protection stand point, to paint the DuraGal component of the fabrication should consideration be given to not blasting the black steel to AS 1627.4 class $2^1/_2$, and then only if the fabrication is to be exposed to the lower end of the "corrosion environment / design life to first maintenance" spectrum.

It could be more cost effective to use attachments that have been hot dip galvanized, zinc plated or blasted and zinc rich primed, rather than black steel attachments.

Protection of Bolts and Bolt Holes

It is preferred that all bolts, nuts and washers used with DuraGal Profiles and hollow Sections should be hot dip Galvanized. Electroplated bolts, nuts and washers are available but AS 2312 says that they are rarely appropriate for exterior exposure conditions.

OneSteel recommends that the bolt holes be treated to stop rusting of the walls of the holes in the assembled joints. In all cases it is preferable that the bare walls of the holes be protected by a system appropriate for the exposure conditions to be experienced.

The following are the recommended protection for: -

a) *Corrosion Environments Similar to Atmospheric Corrosion Classifications up to and Including AS/NZS 2312;1994 Tropical*

It is preferable to prime the surface of the hole, but at the very least, assemble the joint with silicone sealant. in the hole, on the bolt and under both washers.

b) *Corrosion Environments Similar to Atmospheric Corrosion Classifications up to and Including AS/NZS 2312;1994 Severe Marine*

It is preferable to prime the surface of the hole using epoxy primers, but at the very least, assemble the joint with a corrosion resistant epoxy or urethane sealant, in the hole, on the bolt, under both washers and over the outside of the exposed fasteners.

The sealant used must be suitable to replace a tar epoxy system and last 25 years in a severe marine environment. Its features should include , but not be limited to the following :-

- Must provide excellent corrosion resistance.
- Provide long lasting flexibility with elasticity and impact resistance.
- Provide excellent adhesion.
- Enable exceptional hold up on edges, corners, welds, bolts, rivets, etc.

TABLE 1

CORROSION PROTECTION FOR DURAGAL - DESIGN GUIDE

Architectural Domestic and Factory Manufactured Items

For Atmospheric Classifications up to & Including **Tropical**	Part to be Painted	Recommended Corrosion Protection Options Suitable for Atmospheric Classifications up to and Including AS/NZS 2312:1994 Tropical					
		Short Term Exterior Protection (from 2 to 5 years)	**PRN** *	**Medium Term Exterior Protection** (from 5 to 10 years)	**PRN** *	**Long Term Exterior Protection** (from 10 to 20 years)	**PRN** *
Using **Water-Borne** Coatings Where Suitable	**Finish** Body & Weld	Unpainted DuraGal		Unpainted DuraGal		Unpainted DuraGal	
	Weld Pre- Prep	Hand or power tool clean to class 1 or abrasive blast to class1. [1] Water borne Acrylic latex zinc phosphate primer (35 to 50 microns DFT). 2 coats of acrylic latex gloss (each coat 35 to 50 microns DFT). [5]	11	Hand or power tool clean to class 1 or abrasive blast to class 1. [1] Epoxy mastic (150 to 200 micron DFT). [5] or Power tool clean to class 2, or abrasive blast to class $2\frac{1}{2}$ [1] Chlorinated rubber zinc phos. primer (65 to 85 microns DFT). 2 coats of chlorinated rubber gloss (each coat 35 to 50 microns DFT). [5]	32 21 ? 25	Hand or power tool clean to class 1 or abrasive blast to class 1. [1] Epoxy mastic (200 to 250 micron DFT). [4,5]	32
Using Mainly **Solvent Based** Coatings	**Finish** Body & Weld	Unpainted DuraGal		Unpainted DuraGal		Unpainted DuraGal	
	Weld Pre- Prep	Hand or power tool clean to class 1 or abrasive blast to class1. Galvanized iron primer (30microns DFT). 2 coats of alkyd gloss (each coat 35 to 50 microns DFT). [5] or Epoxy zinc phosphate primer (35 to 50 microns DFT). 2 coats of Galmet DuraGal Silver Paint (each 35 to 50 Microns DFT).	5 20 6	Hand or power tool clean to class 1 or abrasive blast to class 1. [1] Epoxy mastic (150 to 200 micron DFT). [5] or Power tool clean to class 2, or abrasive blast to class $2\frac{1}{2}$ [1] Chlorinated rubber zinc phos. primer (35 to 50 microns DFT). 2 coats of chlorinated rubber gloss (each coat 35 to 50 microns DFT). [5]	32 ? 25	Hand or power tool clean to class 1 or abrasive blast to class 1. [1] Epoxy mastic (200 to 250 micron DFT). [4,5]	32

Notes!! **Additional protection is required for DuraGal in Marine and Industrial classifications where the surface is not washed by rain, ie under eaves or horizontal faces of members. Painting as specified in the next highest option is recommended.**

* PRN - paint reference number (see Appendix C of AS/NZS 2312 :1994.)

? There is no PRN number in AS/NZS 2312 for a chlorinated rubber primer.

1 Refer to AS 1627 Parts 2,4,5,7 or 9 for surface preparation

4 If this weld touch-up is applied in two coats, ie base coat & the second coat which is the body coat, each coat should be 150 to 200 microns DFT to ensure suitable coalescence of the spray droplets & thus minimise pin holes

5 To colur match the DuraGal finish overcoat with an aluminium pigmented paint. Galmet DuraGal Silver is generally suitable.

TABLE 2

CORROSION PROTECTION FOR DURAGAL - DESIGN GUIDE

Architectural Domestic and Factory Manufactured Items

For Atmospheric Classifications up to & Including **Marine** (Some suitable for severe marine)	Part to be Painted	Recommended Corrosion Protection Options Suitable for Atmospheric Classifications up to and Including AS/NZS 2312:1994 Marine (Those suitable for Severe Marine denoted [2])					
		Short Term Exterior Protection (from 2 to 5 years)	PRN *	**Medium Term Exterior Protection** (from 5 to 10 years)	PRN *	**Long Term Exterior Protection** (from 10 to 20 years)	PRN *
Using Water-Borne Coatings Where Suitable	**Finish** Body & Weld	Clean & degrease with mild alkaline degreaser or methylated spirits. 2 coats of flat, satin or gloss acrylic self priming emulsion (each 30 to 40 microns DFT). [3] 2nd coat optional depending on location and colour	21	Clean & degrease with mild alkaline degreaser or methylated spirits. Water bourne 2-pack epoxy ZP primer (35 to 50 microns DFT). MIO water bourne epoxy (100 To 125 microns DFT). If a finish colour is required, 1or 2 coats of a water based self priming acrylic (each 30 to 40 microns DFT). [2]	21	Clean & degrease with mild alkaline degreaser or methylated spirits. Water bourne 2-pack epoxy ZP primer (35 to 50 microns DFT). MIO water bourne epoxy (100 To 125 microns DFT). If a finish colour is required, 1or 2 coats of a water based self priming acrylic (each 30 to 40 microns DFT).	6 13 21
	Weld Pre- Prep	Hand or power tool clean to class 1 or abrasive blast to class 1. [1] Epoxy mastic (150 to 200 micron DFT). [2]	32	Hand or power tool clean to class 1 or abrasive blast to class 1. [1] Epoxy mastic (150 to 200 micron DFT). [2]	32	Hand or power tool clean to class 1 or abrasive blast to class 1. [1] Epoxy mastic. (150 to 200 micron DFT)	32
Using Mainly Solvent Based Coatings	**Finish** Body & Weld	Clean & degrease with mild alkaline degreaser or methylated spirits. Galvanized iron primer (30 microns DFT). 2 coats of alkyd enamel (each 35 to 50 microns DFT). [2] 2nd coat optional depending on location and colour	10 20	Clean & degrease with mild alkaline degreaser or methylated spirits. 2-pack epoxy system (35 to 50 microns DFT). 2 coats of a 2-pack acrylic or polyurethane gloss (each 40 to 50 microns DFT). [2]	6 33 or 26	Clean & degrease with mild alkaline degreaser or methylated spirits. 2-pack epoxy system (125 to 150 microns DFT). 2 coats of a 2-pack acrylic or polyurethane gloss (each 40 to 50 microns DFT). [2] (check with your paint supplier for suitability of their system over DuraGal & DuraGal Profile surfaces.)	6 33 or 26
	Weld Pre- Prep	Hand or power tool clean to class 1 or abrasive blast to class 1. [1] Epoxy mastic (150 to 200 micron DFT). [2]	32	Hand or power tool clean to class 1 or abrasive blast to class 1. [1] Epoxy mastic (150 to 200 micron DFT). [2]	32	Hand or power tool clean to class 1 or abrasive blast to class 1. [1] Epoxy mastic (150 to 200 micron DFT). or Abrasive blast to class 2 1/2 [1] Epoxy mastic (225 to 300 microns DFT). [2,4]	32 32

Notes !! **Additional protection is required for DuraGal in Marine and Industrial classifications where the surface is not washed by rain, ie under eaves or horizontal faces of members. Painting as specified in the next highest option is recommended.**

* PRN - paint reference number (see Appendix C of AS/NZS 2312 :1994.)

? There is no PRN number in AS/NZS 2312 for a chlorinated rubber primer.

1 Refer to AS 1627 Parts 2,4,5,7 or 9 for surface preparation.

2 These systems suitable for use in AS/NZS 2312:1994 Severe Marine atmospheric classisifications (see table 3.1 AS/ NZS 2312)

3 Not suitable for severe marine exposure to AS/NZS 2312. To be acceptable for this exposure level a water based acrylic latex (galvanized iron) primer should be applied pror to the finish coats

4 If this weld touch-up is applied in two coats, ie base coat & the second coat which is the body coat, each coat should be 150 to 200 microns DFT to ensure suitable coalescence of the spray droplets & thus minimise pin holes

TABLE 3
CORROSION PROTECTION FOR DURAGAL - DESIGN GUIDE

	Part to be Painted	Point of Sale Decoration for Factory Manufactured Items	PRN *	Protection for Dry Mild Internal Environments in Buildings	PRN *
Using **Water-Borne** Coatings Where Suitable	**Finish** Body & Weld	Clean & degrease with mild alkaline degreaser or methylated spirits. 2 coats of acrylic latex gloss. (each coat 35 to 50 microns DFT)	21	Unpainted DuraGal	
	Weld Pre- Prep	Nothing or dress to improve appearance. or Hand or power tool clean to class 1 or abrasive blast to class1. [1] Water borne Acrylic latex zinc phos. primer . (35 to 50 microns DFT)	11	Hand or power tool clean to class 1 or abrasive blast to class1. [1] Water borne Acrylic latex zinc phosphate primer . (35 to 50 microns DFT) 2 coats of acrylic latex gloss. (each coat 35 to 50 microns DFT) [5]	11 21
Using Mainly **Solvent Based** Coatings	**Finish** Body & Weld	Clean & degrease with mild alkaline degreaser or methylated spirits. Galvanized iron primer (30 microns DFT) 2 coats of alkyd enamel gloss. (each coat 35 to 50 microns DFT)	20	Unpainted DuraGal	
	Weld Pre- Prep	Nothing or dress to improve appearance. or Hand or power tool clean to class 1 or abrasive blast to class 1. [1]		Hand or power tool clean to class 1 or abrasive blast to class1. [1] Galvanized iron primer (30 microns DFT) 2 coats of alkyd enamel gloss. (each coat 35 to 50 microns DFT) [5]	5 20

TABLE 4
CORROSION PROTECTION FOR DURAGAL - DESIGN GUIDE

	Part to be Painted	Protection for Wet Internal Environments in Buildings (no salt, chlorine or other acidic chemicals)			Protection for Harsh Wet Internal Environments in Buildings (Atmosphere includes salt, chlorine &/or other acidic chemicals)		
		Short Term Protection (2 to 5 years)	**Medium Term Protection** (5 to 10 years)	**Long Term Protection** (10 to 15 years)	**Short Term Protection** (2 to 5 years)	**Medium Term Protection** (5 to 10 years)	**Long Term Protection** (10 to 15 years)
Using **Water-Borne** Coatings Where Suitable	**Finish** Body & Weld **Weld** Pre- Prep	To achieve suitable protection for this environment. Use the AS/NZS 2312 recommended corrosion systems suitable for atmospheric classifications up to Tropical - see Table 1			To achieve suitable protection for this environment, Use the AS/NZS 2312 recommended corrosion systems suitable for atmospheric classifications up to Severe Marine - see Table 2		
Using Mainly **Solvent Based** Coatings	**Finish** Body & Weld **Weld** Pre- Prep						

Notes!! Additional protection is required for DuraGal In Marine and Industrial classifications where the surface is not washed by rain, ie under eaves or horizontal faces of members. Painting as specified in the next highest option is recommended.

* PRN - paint reference number (see Appendix C of AS/NZS 2312 :1994.)

? There is no PRN number in AS/NZS 2312 for a chlorinated rubber primer

1 Refer to AS 1627 Parts 2,4,5,7 or 9 for surface preparation

4 If this weld touch-up is applied in two coats, ie base coat & the second coat which is the body coat, each coat should be 150 to 200 microns DFT to ensure suitable coalescence of the spray droplets & thus minimise pin holes.

5 To colur match the DuraGal finish overcoat with an aluminium pigmented paint. Galmet DuraGal Silver is generally suitable.

PUBLIC FILE 12

CORROSION PROTECTION FOR DURAGAL - SUBSTITUTION TABLE

Selected Paint System for Black Steel	PRN *	AS 2312 System Ref. No.	Part to be Painted	Recommended Equivalent Corrosion Protection System for DuraGal	PRN *
Hand or Power Tool Clean, Class 1.[1] Alkyd Primer (35 to 50 microns DFT)	5	SP1 - A	Body	Unpainted DuraGal[2]	
			Weld	Hand or power tool clean, class 1.[1] Chlorinated Rubber or Solvent Based Vinyl Zinc Phosphate Primer (35 to 50 microns DFT)[3,4]	?,7
Hand or Power Tool Clean, Class 1.[1] Epoxy Mastic (100 to 125 microns DFT)	32	SP3 - A	Body	Unpainted DuraGal[2]	
			Weld	Hand or Power Tool Clean, Class 1.[1] Epoxy Mastic (150 to 200 microns DFT)[3,4]	32
Hand or Power Tool Clean, Class 1.[1] Alkyd Primer (35 to 50 microns DFT) Alkyd U/coat (35 to 50 microns DFT) Alkyd Gloss (35 to 50 microns DFT)	5 18 20	SP4 - A	Body	DuraGal, Solvent Cleaned with Clean Rag Chlorinated Rubber or Solvent Based Vinyl Zinc Phosphate Primer (35 to 50 microns DFT) Alkyd Gloss (35 to 50 microns DFT)	?,7 20
			Weld	Hand or Power Tool Clean, Class 1.[1] Chlorinated Rubber or Solvent Based Vinyl Zinc Phosphate Primer (35 to 50 microns DFT) Alkyd Undercoat (35 to 50 microns DFT) Alkyd Gloss (35 to 50 microns DFT)	?,7 18 20
Hand or Power Tool Clean, Class 1.[1] Alkyd Primer (35 to 50 microns DFT) 2 coats of Alkyd Gloss (each 35 to 50 microns DFT)	5 20 20	SP5 - A	Body	DuraGal, Solvent Cleaned with Clean Rag Chlorinated Rubber or Solvent Based Vinyl Zinc Phosphate Primer (35 to 50 microns DFT) Alkyd Gloss (35 to 50 microns DFT)[3]	?,7 20
			Weld	Hand or Power Tool Clean, Class 1.[1] Chlorinated Rubber or Solvent Based Vinyl Zinc Phosphate Primer (35 to 50 microns DFT) 2 Coats of Alkyd Gloss (Each 35 to 50 microns DFT)	?,7 20
Hand or Power Tool Clean, Class 1.[1] Alkyd Primer (35 to 50 microns DFT) 2 Coats of Acrylic Gloss Latex (Each 35 to 50 microns DFT)	5 21	SP5 - D	Body	DuraGal, Solvent Cleaned with Clean Rag Chlorinated Rubber or Solvent Based Vinyl Zinc Phosphate Primer (35 to 50 microns DFT 2 Coats of Acrylic Latex Gloss (Each 35 to 50 microns DFT)	?,7 21
			Weld	Hand or Power Tool Clean, Class 1.[1] Chlorinated Rubber or Solvent Based Vinyl Zinc Phosphate Primer (35 to 50 microns DFT) 2 Coats of Acrylic Latex Gloss (Each 35 to 50 microns DFT)	?,7 21
Abrasive Blast, Class $2^1/_2$.[1] Inorganic Zinc Silicate (65 to 75 Microns DFT)	1	MP1 - A	Body	DuraGal, Solvent Cleaned with Clean Rag Epoxy Mastic (150 to 200 microns DFT)	32
			Weld	Hand or Power Tool Clean, Class 1.[1] Epoxy Mastic (200 to 250 microns DFT)[5]	32

Notes !! Additional protection is required for Unpainted DuraGal in Marine and Industrial classifications where the surface is not washed by rain, ie under eaves or horizontal faces of members. Painting as specified in the next highest option is recommended.

* PRN - paint reference number (see Appendix C of AS/NZS 2312 1994.)

? There is no PRN number in AS/NZS 2312 for a Chlorinated rubber primer.

1 Refer to AS 1627 Parts 2,4,5,7 or 9 for surface preparation.

2 If the weld area needs to be colour matched with the DuraGal finish, use an aluminium pigmented coating of the paint type listed. Galmet DuraGal Silver paint is generally suitable as an additional coat applied to the above systems.

3 Where a decorative finish is required on the Duragal body, apply one or two coats of gloss acrylic latex. Where maximum resistance to wear, abrasion or general chemical attack is required apply finish coats of two pack polyurethane. DuraGal must not be "white rusted" and will also require solvent cleaning with clean rags before application of the decorative coating. "White rust " must be mechanically or chemically removed before solvent cleaning and painting. See the DuraGal painting guide for more information on surface preparation.

4 If this weld touch-up is applied in two coats, ie base coat & the second coat which is the body coat, each coat should be 150 to 200 microns DFT to ensure suitable coalescence of the spray droplets & thus minimise pin holes.

CORROSION PROTECTION FOR DURAGAL - SUBSTITUTION TABLE - Continued

Selected Paint System for Black Steel	PRN *	AS 2312 System Ref. No.	Part to be Painted	Recommended Equivalent Corrosion Protection System for DuraGal	PRN *
Abrasive Blast, Class 2½.[1] High-Build Epoxy (200 to 250 Microns DFT)	13	MP1 - C	**Body**	DuraGal, Solvent Cleaned with Clean Rag High-Build Epoxy (200 to 250 Microns DFT)	13
			Weld	Hand or Power Tool Clean, Class 1.[1] Epoxy Mastic (150 to 200 microns DFT) High-Build Epoxy (200 to 250 Microns DFT)	32 13
Abrasive Blast, Class 2½.[1] Inorganic Zinc Silicate (65 to 75 microns DFT) 2 Coats of Acrylic Latex (Each 35 to 50 Microns DFT)	1 21	MP2 - A	**Body**	DuraGal, Solvent Cleaned with Clean Rag Epoxy Mastic (150 to 200 microns DFT) 2 Coats of Acrylic Latex (Each 35 to 50 Microns DFT)	32 21
			Weld	Hand or Power Tool Clean, Class 1.[1] Epoxy Mastic (200 to 250 microns DFT)[5] 2 Coats of Acrylic Latex (Each 35 to 50 Microns DFT)	32 21
Abrasive Blast, Class 2½.[1] Inorganic Zinc Silicate (65 to 75 Microns DFT) Vinyl Primer (25 to 35 Microns DFT) Alkyd Gloss (35 to 50 Microns DFT)	1 7 20	MP3 - A	**Body**	DuraGal, Solvent Cleaned with Clean Rag Epoxy Mastic (150 to 200 microns DFT) Alkyd Gloss (35 to 50 Microns DFT)	32 20
			Weld	Hand or Power Tool Clean, Class 1.[1] Epoxy mastic (200 to 250 microns DFT)[5] Alkyd Gloss (35 to 50 Microns DFT)	32 20
Abrasive Blast, Class 2½.[1] Inorganic Zinc Silicate (65 to 75 microns DFT) High-Build Epoxy (100 to 125 Microns DFT) Two-Pack Epoxy Gloss (40 to 50 Microns DFT)	1 13 24	MP5 - A	**Body**	DuraGal, Solvent Cleaned with Clean Rag Epoxy Mastic (150 to 200 microns DFT) High-Build Epoxy (100 to 125 Microns DFT) Two-Pack Epoxy Gloss (40 to 50 Microns DFT)	32 13 24
			Weld	Hand or Power Tool Clean, Class 1.[1] Epoxy Mastic (200 to 250 microns DFT)[5] High-Build Epoxy (100 to 125 Microns DFT) Two-Pack Epoxy Gloss (40 to 50 Microns DFT)	32 13 24
Abrasive Blast, Class 2½.[1] Inorganic Zinc Silicate (65 to 75 microns DFT) High-Build Epoxy (100 to 125 Microns DFT) Two-Pack Acrylic Gloss (40 to 50 Microns DFT)	1 13 33	MP5 - B	**Body**	DuraGal, Solvent Cleaned with Clean Rag Epoxy Mastic (150 to 200 microns DFT) High-Build Epoxy (100 to 125 Microns DFT) Two-Pack Acrylic Gloss (40 to 50 Microns DFT)	32 13 33
			Weld	Hand or Power Tool Clean, Class 1.[1] Epoxy Mastic (200 to 250 microns DFT)[5] High-Build Epoxy (100 to 125 Microns DFT) Two-Pack Acrylic Gloss (40 to 50 Microns DFT)	32 13 33

Notes!! Additional protection is required for Unpainted DuraGal in Marine and Industrial classifications where the surface is not washed by rain, ie under eaves or horizontal faces of members. Painting as specified in the next highest option is recommended.

* PRN - paint reference number (see Appendix C of AS/NZS 2312 :1994.)

? There is no PRN number in AS/NZS 2312 for a Chlorinated rubber primer.

1 Refer to AS 1627 Parts 2,4,5,7 or 9 for surface preparation.

2 If the weld area needs to be colour matched with the DuraGal finish, use an aluminium pigmented coating of the paint type listed. Galmet DuraGal Silver paint is generally suitable as an additional coat applied to the above systems.

3 Where a decorative finish is required on the Duragal body, apply one or two coats of gloss acrylic latex. Where maximum resistance to wear, abrasion or general chemical attack is required apply finish coats of two pack polyurethane. DuraGal must not be "white rusted" and will also require solvent cleaning with clean rags before application of the decorative coating. "White rust " must be mechanically or chemically removed before solvent cleaning and painting. See the DuraGal painting guide for more information on surface preparation.

4 If this weld touch-up is applied in two coats, ie base coat & the second coat which is the body coat, each coat should be 150 to 200 microns DFT to ensure suitable coalescence of the spray droplets & thus minimise pin holes.

CORROSION PROTECTION FOR DURAGAL - SUBSTITUTION TABLE - Continued

Selected Paint System for Black Steel	PRN *	AS 2312 System Ref. No.	Part to be Painted	Recommended Equivalent Corrosion Protection System for DuraGal	PRN *
Abrasive Blast, Class 2½.[1]			**Body**	DuraGal, Solvent Cleaned with Clean Rag	
Inorganic Zinc Silicate (65 to 75 microns DFT)	1			Epoxy Mastic (150 to 200 microns DFT)	32
High-Build Epoxy (100 to 125 Microns DFT)	13	**MP5 - D**		High-Build Epoxy (100 to 125 Microns DFT)	13
Two-Pack Polyurethane Gloss (40 to 50 Microns DFT)	26			Two-Pack Polyurethane Gloss (40 to 50 Microns DFT)	26
			Weld	Hand or Power Tool Clean, Class 1.[1]	
				Epoxy Mastic (200 to 250 microns DFT)[5]	32
				High-Build Epoxy (100 to 125 Microns DFT)	13
				Two-Pack Polyurethane Gloss (40 to 50 Microns DFT)	26
Abrasive Blast, Class 2½.[1]			**Body**	DuraGal, Solvent Cleaned with Clean Rag	
Two-Pack Epoxy Primer (35 to 50 microns DFT)	6	**MP5 - I**		High-Build Epoxy (100 to 125 Microns DFT)	13
High-Build Epoxy (100 to 125 Microns DFT)	13			Two-Pack Epoxy Gloss (40 to 50 Microns DFT)	24
Two-Pack Epoxy Gloss (40 to 50 Microns DFT)	24		**Weld**	Hand or Power Tool Clean, Class 1.	
				Epoxy mastic (150 to 200 microns DFT)	32
				High-Build Epoxy (100 to 125 Microns DFT)	13
				Two-Pack Epoxy Gloss (40 to 50 Microns DFT)	24
Abrasive Blast, Class 2½.[1]			**Body**	DuraGal, Solvent Cleaned with Clean Rag	
Two-Pack Epoxy Primer (35 to 50 microns DFT)	6	**MP5 - J**		High-Build Epoxy (100 to 125 Microns DFT)	13
High-Build Epoxy (100 to 125 Microns DFT)	13			Two-Pack Acrylic Gloss (40 to 50 Microns DFT)	33
Two-Pack Acrylic Gloss (40 to 50 Microns DFT)	33		**Weld**	Hand or Power Tool Clean, Class 1.[1]	
				Epoxy mastic (150 to 200 microns DFT)	32
				High-Build Epoxy (100 to 125 Microns DFT)	13
				Two-Pack Acrylic Gloss (40 to 50 Microns DFT)	33
Abrasive Blast, Class 2½.[1]			**Body**	DuraGal, Solvent Cleaned with Clean Rag	
Two-Pack Epoxy Primer (35 to 50 microns DFT)	6	**MP5 - K**		High-Build Epoxy (100 to 125 Microns DFT)	13
High-Build Epoxy (100 to 125 Microns DFT)	13			Two-Pack Polyurethane Gloss (40 to 50 Microns DFT)	26
Two-Pack Polyurethane Gloss (40 to 50 Microns DFT)	26		**Weld**	Hand or Power Tool Clean, Class 1.[1]	
				Epoxy mastic (150 to 200 microns DFT)	32
				High-Build Epoxy (100 to 125 Microns DFT)	13
				Two-Pack Polyurethane Gloss (40 to 50 Microns DFT)	26
Hand or Power Tool Clean, Class 1, or abrasive Blast Class 1.[1]		**MP8 - A**	**Body**	DuraGal, Solvent Cleaned with Clean Rag	
Epoxy Mastic (125 to 175 microns DFT)	32			Epoxy Mastic (150 to 200 microns DFT)	32
			Weld	Hand or Power Tool Clean, Class 1.[1]	
				Epoxy Mastic (150 to 200 microns DFT)	32

Notes !! Additional protection is required for Unpainted DuraGal in Marine and Industrial classifications where the surface is not washed by rain, ie under eaves or horizontal faces of members. Painting as specified in the next highest option is recommended.

* PRN - paint reference number (see Appendix C of AS/NZS 2312 :1994.)

? There is no PRN number in AS/NZS 2312 for a Chlorinated rubber primer.

1 Refer to AS 1627 Parts 2,4,5,7 or 9 for surface preparation.

2 If the weld area needs to be colour matched with the DuraGal finish, use an aluminium pigmented coating of the paint type listed. Galmet DuraGal Silver paint is generally suitable as an additional coat applied to the above systems.

3 Where a decorative finish is required on the Duragal body, apply one or two coats of gloss acrylic latex. Where maximum resistance to wear, abrasion or general chemical attack is required apply finish coats of two pack polyurethane. DuraGal must not be "white rusted" and will also require solvent cleaning with clean rags before application of the decorative coating. "White rust " must be mechanically or chemically removed before solvent cleaning and painting. See the DuraGal painting guide for more information on surface preparation.

4 If this weld touch-up is applied in two coats, ie base coat & the second coat which is the body coat, each coat should be 150 to 200 microns DFT to ensure suitable coalescence of the spray droplets & thus minimise pin holes.

CORROSION PROTECTION FOR DURAGAL - SUBSTITUTION TABLE - Continued

Selected Paint System for Black Steel	PRN *	AS 2312 System Ref. No.	Part to be Painted	Recommended Equivalent Corrosion Protection System for DuraGal	PRN *
Abrasive Blast, Class 2 1/2 [1] Inorganic Zinc Silicate (65 to 75 microns DFT) High-Build Epoxy (125 to 150 Microns DFT)	1 13	MP9 - A	**Body**	DuraGal, Solvent Cleaned with Clean Rag Epoxy Mastic (150 to 200 microns DFT) High-Build Epoxy (125 to 150 Microns DFT)	 32 13
			Weld	Hand or Power Tool Clean, Class 1. [1] Epoxy Mastic (200 to 250 microns DFT)[5] High-Build Epoxy (125 to 150 Microns DFT)	 32 13
Abrasive Blast. Class 2 1/2. [1] Inorganic Zinc Silicate (70 to 85 microns DFT) 2 Coats of High-Build Epoxy (Each 100 to 125 Microns DFT)	1 13	LP1 - A	**Body**	DuraGal, Solvent Cleaned with Clean Rag Epoxy Mastic (150 to 200 microns DFT) 2 coats of High-Build Epoxy (Each 250 to 300 Microns DFT)	 32 13
			Weld	Class 2 1/2 Blast the Weld [1] Epoxy Mastic (200 to 250 microns DFT)[5] 2 coats of High-Build Epoxy (Each 100 to 125 Microns DFT)	 32 13
Abrasive Blast, Class 2 1/2 or acid pickle. [1] Two-Pack Epoxy Primer (65 to 75 Microns DFT) 2 Coats of High-Build Epoxy / MIO (Each 100 to 125 Microns DFT)	6 13	LP1 - I	**Body**	DuraGal, Solvent Cleaned with Clean Rag 2 Coats of High-Build Epoxy / MIO (Each 100 to 125 Microns DFT)	 13
			Weld	Class 2 1/2 Blast the Weld [1] Epoxy Mastic (150 to 200 microns DFT) 2 Coats of High-Build Epoxy / MIO (Each 100 to 125 Microns DFT)	 32 13
Abrasive Blast, Class 2 1/2. [1] Inorganic Zinc Silicate (70 to 85 microns DFT) High-Build Epoxy / MIO (175 to 200 Microns DFT)	1 13	LP2 - A	**Body**	DuraGal, Solvent Cleaned with Clean Rag Epoxy Mastic (150 to 200 microns DFT) High-Build Epoxy / MIO (175 to 200 Microns DFT)	 32 13
			Weld	Class 2 1/2 Blast the Weld [1] Epoxy Mastic (200 to 250 microns DFT)[5] High-Build Epoxy / MIO (175 to 200 Microns DFT)	 32 13
Abrasive Blast, Class 2 1/2. [1] Inorganic Zinc Silicate (70 to 85 microns DFT) High-Build Epoxy (175 to 200 Microns DFT)	1 13	LP2 - C	**Body**	DuraGal, Solvent Cleaned with Clean Rag Epoxy Mastic (150 to 200 microns DFT) High-Build Epoxy (175 to 200 Microns DFT)	 32 13
			Weld	Class 2 1/2 Blast the Weld [1] Epoxy Mastic (200 to 250 microns DFT)[5] High-Build Epoxy (175 to 200 Microns DFT)	 32 13

Notes !! Additional protection is required for Unpainted DuraGal in Marine and Industrial classifications where the surface is not washed by rain, ie under eaves or horizontal faces of members. Painting as specified in the next highest option is recommended.

* PRN - paint reference number (see Appendix C of AS/NZS 2312 :1994.)

? There is no PRN number in AS/NZS 2312 for a Chlorinated rubber primer.

1 Refer to AS 1627 Parts 2,4,5,7 or 9 for surface preparation.

2 If the weld area needs to be colour matched with the DuraGal finish, use an aluminium pigmented coating of the paint type listed. Galmet DuraGal Silver paint is generally suitable as an additional coat applied to the above systems .

3 Where a decorative finish is required on the Duragal body, apply one or two coats of gloss acrylic latex. Where maximum resistance to wear, abrasion or general chemical attack is required apply finish coats of two pack polyurethane. DuraGal must not be "white rusted" and will also require solvent cleaning with clean rags before application of the decorative coating. "White rust " must be mechanically or chemically removed before solvent cleaning and painting. See the DuraGal painting guide for more information on surface preparation.

4 If this weld touch-up is applied in two coats, ie base coat & the second coat which is the body coat, each coat should be 150 to 200 microns DFT to ensure suitable coalescence of the spray droplets & thus minimise pin holes.

CORROSION PROTECTION FOR DURAGAL - SUBSTITUTION TABLE - Continued

Selected Paint System for Black Steel	PRN *	AS 2312 System Ref. No.	Part to be Painted	Recommended Equivalent Corrosion Protection System for DuraGal	PRN *
Abrasive Blast, Class 2½.[1]			**Body**	DuraGal, Solvent Cleaned with Clean Rag	
Inorganic Zinc Silicate (70 to 85 microns DFT)	1	**LP4 - A**		Epoxy Mastic (150 to 200 microns DFT)	32
High-Build Epoxy (125 to 150 Microns DFT)	13			High-Build Epoxy (150 to 200 Microns DFT)	13
Acrylic Latex (35 to 50 Microns DFT)	21			Acrylic Latex (35 to 50 Microns DFT)	21
			Weld	Class 2½ Blast the Weld[1]	
				Epoxy Mastic (200 to 250 microns DFT)[5]	32
				High-Build Epoxy (150 to 200 Microns DFT)	13
				Acrylic Latex (35 to 50 Microns DFT)	21
Abrasive Blast, Class 2½.[1]			**Body**	DuraGal, Solvent Cleaned with Clean Rag	
Inorganic Zinc Silicate (70 to 85 microns DFT)	1	**LP6 - A**		Epoxy Mastic (150 to 200 microns DFT)	32
High-Build Epoxy (150 to 200 Microns DFT)	13			High-Build Epoxy (150 to 200 Microns DFT)	13
Two-Pack Acrylic Gloss (40 to 50 Microns DFT)	33			Two-Pack Acrylic Gloss (40 to 50 Microns DFT)	33
			Weld	Class 2½ Blast the Weld[1]	
				Epoxy Mastic (200 to 250 microns DFT)[5]	32
				High-Build Epoxy (150 to 200 Microns DFT)	13
				Two-Pack Acrylic Gloss (40 to 50 Microns DFT)	33
Abrasive Blast, Class 2½.[1]			**Body**	DuraGal, Solvent Cleaned with Clean Rag	
Inorganic Zinc Silicate (70 to 85 microns DFT)	1	**LP6 - B**		Epoxy Mastic (150 to 200 microns DFT)	32
High-Build Epoxy (150 to 200 Microns DFT)	13			High-Build Epoxy (150 to 200 Microns DFT)	13
Two-Pack Polyurethane Gloss (40 to 50 Microns DFT)	26			Two-Pack Polyurethane Gloss (40 to 50 Microns DFT)	26
			Weld	Class 2½ Blast the Weld[1]	
				Epoxy Mastic (200 to 250 microns DFT)[5]	32
				High-Build Epoxy (150 to 200 Microns DFT)	13
				Two-Pack Polyurethane Gloss (40 to 50 Microns DFT)	26

Notes !! Additional protection is required for Unpainted DuraGal in Marine and Industrial classifications where the surface is not washed by rain, ie under eaves or horizontal faces of members. Painting as specified in the next highest option is recommended.

* PRN - paint reference number (see Appendix C of AS/NZS 2312 :1994.)

? There is no PRN number in AS/NZS 2312 for a Chlorinated rubber primer.

1 Refer to AS 1627 Parts 2,4,5,7 or 9 for surface preparation.

2 If the weld area needs to be colour matched with the DuraGal finish, use an aluminium pigmented coating of the paint type listed. Galmet DuraGal Silver paint is generally suitable as an additional coat applied to the above systems.

3 Where a decorative finish is required on the Duragal body, apply one or two coats of gloss acrylic latex. Where maximum resistance to wear, abrasion or general chemical attack is required apply finish coats of two pack polyurethane. DuraGal must not be "white rusted" and will also require solvent cleaning with clean rags before application of the decorative coating. "White rust " must be mechanically or chemically removed before solvent cleaning and painting. See the DuraGal painting guide for more information on surface preparation.

4 If this weld touch-up is applied in two coats, ie base coat & the second coat which is the body coat, each coat should be 150 to 200 microns DFT to ensure suitable coalescence of the spray droplets & thus minimise pin holes.

Coating Systems for DuraGal Profiles and Hollow Sections for AS/NZS 2312:1994 Exposures

The coatings manufacturers listed on the following pages have carried out their own evaluation for the DuraGal Family of Products® and the atmospheric exposure categories listed within AS/NZS 2312:1994.

For further information on the coatings listed, OneSteel recommends you contact the coatings manufacturer directly to discuss the details of your application, and obtain detailed data sheets on surface preparation, application and safe use of their products.

OneSteel Direct can assist you by providing the nearest location and contact details for the nominated coatings manufacturers listed in this guide.

OneSteel Direct

Freecall: 1800 065 415
Freefax: 1800 800 744
e-mail: onesteeldirect@onesteel.com

Coating Systems for DuraGal Profiles and Hollow Sections for AS/NZS 2312:1994 Exposures

Akzo Nobel

Surface Preparation: Refer to manufacturer's data sheets.
Note1: For specifications refer to Akzo Nobel personnel
Note2: Please refer to manufacturer's data sheets for detailed information on safety requirements, application and paint properties.

AS/NZS 2312 Exposure	Weld Coat and cut edges	DFT micron	Primer	DFT micron	Intermediate Coat	DFT micron	Top Coat	DFT micron	Total film thickness	Coating System Type
Mild *										
Short Term	Interzinc 352	30	Interprime 741	10	-	-	Interlac 645	50	60	Vinyl/Alkyd
Medium Term	Interzinc 352	50	Interprime 741	10	-	-	Interfine 629	75	85	Vinyl/Two pack acrylic
Long Term	Interzinc 42	50	Intergard 269	40	-	-	Interfine 629	75	115	Epoxy/Two pack acrylic
Moderate *										
Short Term	Interzinc 352	30	Interprime 741	10	Interlac 645	50	Interlac 645	50	110	Vinyl/Alkyd
Medium Term	Interzinc 352	30	Intergard 269	40	Interplus 356	75	Interfine 629	75	190	Epoxy/Two pack acrylic
Long Term	Interzinc 42	50	Intergard 269	40	Interplus 356	75	Interfine 629	75	190	Epoxy/Two pack acrylic
Tropical *										
Short Term	Interzinc 42	50	Intergard 269	40	-	-	Interfine 629	75	115	Epoxy/Two pack acrylic
Medium Term	Interzinc 42	50	Intergard 269	40	Interplus 356	75	Interfine 629	75	190	Epoxy/Two pack acrylic
Long Term	Interzinc 42	50	Intergard 269	40	Interplus 356	75	Interfine 629	75	190	Epoxy/Two pack acrylic
Industrial										
Short Term	Interzinc 42	50	Intergard 269	40	Integard 475 HS	125	Interfine 629	75	240	Epoxy/Two pack acrylic
Medium Term	Interzinc 42	50	Intergard 269	40	Integard 475 HS	125	Interfine 629	75	240	Epoxy/Two pack acrylic
Long Term	Interzinc 42	50	Intergard 269	40	Integard 475 HS	125	Interfine 629	75	240	Epoxy/Two pack acrylic
Marine										
Short Term	Interzinc 42	50	Intergard 269	40	Integard 475 HS	125	Interfine 629	75	240	Epoxy/Two pack acrylic
Medium Term	Interzinc 42	50	Intergard 269	40	Integard 475 HS	125	Interfine 629	75	240	Epoxy/Two pack acrylic
Long Term	Interzinc 42	50	Intergard 269	40	Integard 475 HS	125	Interfine 629	75	240	Epoxy/Two pack acrylic
Severe marine										
Short Term	Interzinc 52	50	Intergard 269	40	Integard 475 HS	125	Interfine 629	75	240	Epoxy/Two pack acrylic
Medium Term	Interzinc 52	50	Intergard 269	40	Integard 475 HS	200	Interfine 629	75	315	Epoxy/Two pack acrylic
Long Term	Interzinc 52	50	Intergard 269	40	Integard 475 HS	200	Interfine 629	75	315	Epoxy/Two pack acrylic

* Coatings generally not required for these atmospheric exposures - refer to the table on page 7 of this guide.

Issue February 2001

Coating Systems for DuraGal Profiles and Hollow Sections for AS/NZS 2312:1994 Exposures

Ameron Coatings

Surface Preparation: Refer to manufacturer's data sheets.
Note1: For additional corrosion protection of DuraGal sections without barrier polymer coating, an application of Ameron Multietch 302 may be beneficial. Contact Ameron for details.
Note2: Please refer to manufacturer's data sheets for detailed information on safety requirements, application and paint properties.

AS/NZS 2312 Exposure	Weld Coat and cut edges	DFT micron	First Coat	DFT micron	Second Coat	DFT micron	Third Coat	DFT micron	Total DFT micron	Coating System Type
Mild *										
Short Term	Zinc rich 311	50	Amercoat 148K	50	Amercoat 5401	50	-	-	100	Galv' iron primer/Gen purpose enamel
Medium Term	Zinc rich 311	50	Amercoat 148K	50	Amercoat 5401	50	-	-	100	Galv' iron primer/Gen purpose enamel
Long Term	Zinc rich 311	50	Amercoat 148K	50	Amercoat 5401	50	-	-	100	Galv' iron primer/Gen purpose enamel
Moderate *										
Short Term	Zinc rich 311	50	Amercoat 148K	50	Amercoat 5401	100	-	-	150	Galv' iron primer/Gen purpose enamel
Medium Term	Zinc rich 311	50	Amercoat 148K	50	Amercoat 5401	100	-	-	150	Galv' iron primer/Gen purpose enamel
Long Term	Zinc rich 311	50	Ameron 783	25	Ameron Iso Free 977	75	-	-	100	Modified resin primer/Two pack acrylic
Tropical *										
Short Term	Amercoat 68K	25-50	Ameron 783	25	Ameron Iso Free 977	75	-	-	100	Modified resin primer/Two pack acrylic
Medium Term	Amercoat 68K	25-50	Amercoat CC24	75	Ameron Iso Free 977	75	-	-	150	Two pack epoxy/Two pack acrylic
Long Term	Amercoat 68K	25-50	Amercoat CC24	100-125	Ameron Iso Free 977	75	-	-	175-200	Two pack epoxy/Two pack acrylic
Industrial										
Short Term	Amercoat 68K	25-50	Amercoat CC24	75	Ameron Iso Free 977	50-75	-	-	125-150	Two pack epoxy/Two pack acrylic
Medium Term	Amercoat 68K	25-50	Amercoat CC24	75	Ameron Iso Free 977	75	-	-	150	Two pack epoxy/Two pack acrylic
Long Term	Amercoat 68K	25-50	Amercoat CC24	125	Ameron Iso Free 977	75	-	-	200	Two pack epoxy/Two pack acrylic
Marine										
Short Term	Amercoat 68K	25-50	Amercoat CC24	75	Ameron Iso Free 977	50	-	-	125	Two pack epoxy/Two pack acrylic
Medium Term	Amercoat 68K	25-50	Amercoat CC24	100	Ameron Iso Free 977	75	-	-	175	Two pack epoxy/Two pack acrylic
Long Term	Amercoat 68K	25-50	Amercoat CC24	125	Ameron Iso Free 977	75	-	-	200	Two pack epoxy/Two pack acrylic
Severe Marine										
Short Term	Amercoat 68K	25-50	Amercoat CC24	125	Ameron Iso Free 977	75	-	-	200	Two pack epoxy/Two pack acrylic
Medium Term	Amercoat 68K	25-50	Ferroclad EX316	125	Ferroclad EX316	125	-	-	250	Micaceous iron oxide epoxy
Long Term	Amercoat 68K	25-50	Ferroclad EX316	125	Ferroclad EX316	125	-	-	250	Micaceous iron oxide epoxy

* Coatings generally not required for these atmospheric exposures – refer to the table on page 7 of this guide.

Issue February 2001

Coating Systems for DuraGal Profiles and Hollow Sections for AS/NZS 2312:1994 Exposures

Dulux

(Dulux, an Orica business)

Surface Preparation: Refer to manufacturer's data sheets. Any welds or cut edges should be power or hand tool cleaned to AS1627.7 Class2
Note1: For specifications refer to Orica personnel
Note2: Please refer to manufacturer's data sheets for detailed information on safety requirements, application and paint properties.

AS/NZS 2312 Exposure	Weld Coat and cut edges	DFT micron	First Coat	DFT micron	Second Coat	DFT micron	Third Coat	DFT micron	Total DFT micron	Coating System Type
Mild *										
Short Term	Zinc Rich 1P	50-60	Gal Iron Primer	20-25	Weathershield X10	25-35	-	-	45-60	Galvanised Iron Primer/ Acrylic
Medium Term	Zinc Rich 1P	50-60	Gal Iron Primer	20-25	Weathershield X10	25-35	-	-	45-60	Galvanised Iron Primer/ Acrylic
Long Term	Zinc Rich 1P	50-60	Duremax GPE	100-150	Luxathane	50-60	-	-	150-210	Epoxy/urethane
Moderate *										
Short Term	Zinc Rich 1P	50-60	Duremax GPE	100-150	Luxathane	50-60	-	-	150-210	Epoxy/urethane
Medium Term	Zinc Rich 1P	50-60	Duremax GPE	100-150	Luxathane	50-60	-	-	150-210	Epoxy/urethane
Long Term	Zinc Rich 1P	50-60	Durebild STE	150-200	Luxathane	50-60	-	-	200-260	Epoxy/urethane
Tropical *										
Short Term	Zinc Rich 1P	50-60	Duremax GPE	100-150	Luxathane	50-60	-	-	150-210	Epoxy/urethane
Medium Term	Zinc Rich 1P	50-60	Durebild STE	150-200	Luxathane	50-60	-	-	200-260	Epoxy/urethane
Long Term	Zinc Rich 1P	50-60	Durebild STE	150-200	Luxathane	50-60	-	-	200-260	Epoxy/urethane
Industrial										
Short Term	Zinc Rich 1P	50-60	Durebild STE	150-200	Luxathane	50-60	-	-	200-260	Epoxy/urethane
Medium Term	Zinc Rich 1P	50-60	Durebild STE	150-200	Luxathane	50-60	-	-	200-260	Epoxy/urethane
Long Term	Zincanode 402	75	Durebild STE	150-200	Weathermax HBR	80-120	-	-	230-320	Epoxy/urethane
Marine										
Short Term	Zincanode 402	75	Durebild STE	150-200	Weathermax HBR	80-120	-	-	230-320	Epoxy/urethane
Medium Term	Zincanode 402	75	Durebild STE	150-200	Weathermax HBR	80-120	-	-	230-320	Epoxy/urethane
Long Term	Zincanode 402	75	Durebild STE	150-200	Weathermax HBR	80-120	-	-	230-320	Epoxy/urethane
Severe marine										
Short Term	Zincanode 402	75	Durebild STE	150-200	Weathermax HBR	80-120	-	-	230-320	Epoxy/urethane
Medium Term	Zincanode 402	75	Durebild STE	150-200	Weathermax HBR	80-120	-	-	230-320	Epoxy/urethane
Long Term	Zincanode 402	75	Durebild STE	150-200	Weathermax HBR	80-120	-	-	230-320	Epoxy/urethane

* Coatings generally not required for these atmospheric exposures - refer to the table on page 7 of this guide.

Coating Systems for DuraGal Profiles and Hollow Sections for AS/NZS 2312:1994 Exposures

Jotun

Surface Preparation: Refer to manufacturer's data sheets.
Note1: Contact Jotun Personnel for coating specifications
Note2: Please refer to manufacturer's data sheets for detailed information on safety requirements, application and paint properties.

AS/NZS 2312 Exposure	Weld Coat and cut edges	DFT micron	First Coat	DFT micron	Second Coat	DFT micron	Third Coat	DFT micron	Total DFT micron	Coating System Type
Mild *										
Short Term	Penguard Special	50	Penguard Special	50	Jotacote 371	40	-	-	90	Epoxy/Catalysed Acrylic
Medium Term	Penguard Special	50	Penguard Special	50	Jotacote 371	40	-	-	90	Epoxy/Catalysed Acrylic
Long Term	Penguard Special	50	Penguard Special	50	Jotacote 371	40	-	-	90	Epoxy/Catalysed Acrylic
Moderate *										
Short Term	Penguard Special	50	Penguard Special	50	Jotacote 371	40	-	-	90	Epoxy/Catalysed Acrylic
Medium Term	Penguard Special	50	Penguard Special	50	Jotacote 371	40	-	-	90	Epoxy/Catalysed Acrylic
Long Term	Penguard Special	50	Penguard Special	50	Jotacote 371	40	-	-	90	Epoxy/Catalysed Acrylic
Tropical *										
Short Term	Penguard Special	50	Penguard Special	50	Jotacote 371	40	-	-	90	Epoxy/Catalysed Acrylic
Medium Term	Penguard Special	50	Penguard Special	50	Jotacote 371	40	-	-	90	Epoxy/Catalysed Acrylic
Long Term	Penguard Special	50	Penguard Special	50	Jotacote 371	40	-	-	90	Epoxy/Catalysed Acrylic
Industrial										
Short Term	Jotacote 605	75	Jotacote 605	100	-	-	-	-	100	Epoxy
Medium Term	Penguard Special	75	Penguard Special	75	Jotacote 371	40	-	-	115	Epoxy/Catalysed Acrylic
Long Term	Jotacote 605	100	Jotacote 605	100	Jotacote 371	40	-	-	140	Epoxy/Catalysed Acrylic
Marine										
Short Term	Jotacote 605	75	Jotacote 605	100	-	-	-	-	100	Epoxy
Medium Term	Penguard HB	75	Penguard HB	75	Jotacote 371	40	-	-	115	Epoxy/Catalysed Acrylic
Long Term	Penguard Special	75	Penguard Special	75	Hardtop AS	40	-	-	115	Epoxy/Polyurethane
Severe marine										
Short Term	Jotamastic 87	100	Jotamastic 87	150	-	-	-	-	150	Epoxy Mastic
Medium Term	Penguard Special	75	Penguard Special	100	Imperite 300	40	-	-	140	Epoxy/Polyurethane
Long Term	Jotacote 605	100	Jotacote 605	150	Imperite 300	40	-	-	190	Epoxy/Polyurethane

* Coatings generally not required for these atmospheric exposures - refer to the table on page 7 of this guide.

Coating Systems for DuraGal Profiles and Hollow Sections for AS/NZS 2312:1994 Exposures

Wattyl Protective Coatings

Surface Preparation: Refer to manufacturer's data sheets.
Note1: For specifications refer to Wattyl personnel
Note2: Please refer to manufacturer's data sheets for detailed information on safety requirements, application and paint properties.

AS/NZS 2312 Exposure	Weld Coat & cut edges	DFT micron	First Coat	DFT micron	Intermediate Coat	DFT micron	Topcoat	DFT micron	Total DFT micron	Coating System Type
Mild *										
Short Term	Galvit E90 LV	50	Killrust Gal Iron Primer*	30	Killrust Gloss Enamel*	35	Killrust Gloss Enamel*	35	100	Single pack
Medium Term	Galvit EP100	50	Sigma EP Primer*	75	-	-	Paracryl IFC*	50	125	Two pack epoxy/catalysed acrylic
Long Term	Galvit EP100	50	Sigma EP Primer*	50	Sigmacover CM*	75	Paracryl IFC*	50	175	Two pack epoxy/catalysed acrylic
Moderate *										
Short Term	Galvit EP100	50	Killrust Gal Iron Primer*	30	Killrust Gloss Enamel*	35	Killrust Gloss Enamel*	35	100	Single pack
Medium Term	Galvit EP100	50	Sigma EP Primer*	75	-	-	Paracryl IFC*	50	125	Two pack epoxy/catalysed acrylic
Long Term	Galvit EP100	50	Sigma EP Primer*	50	Sigmacover CM*	75	Paracryl IFC*	50	175	Two pack epoxy/catalysed acrylic
Tropical *										
Short Term	Galvit EP100	50	Killrust Gal Iron Primer*	30	Killrust Gloss Enamel*	35	Killrust Gloss Enamel*	35	100	Single pack
Medium Term	Galvit EP100	50	Sigma EP Primer*	75	-	-	Paracryl IFC*	50	125	Two pack epoxy/catalysed acrylic
Long Term	Galvit EP100	50	Sigma EP Primer*	50	Sigmacover CM*	75	Paracryl IFC*	50	175	Two pack epoxy/catalysed acrylic
Industrial										
Short Term	Galvit EP100	50	Killrust Gal Iron Primer	30	Killrust Gloss enamel	35	Killrust Gloss Enamel	35	100	Single pack
Medium Term	Galvit EP100	50	Sigma EP Primer	75	-	-	Paracryl IFC	50	125	Two pack epoxy/catalysed acrylic
Long Term	Galvit EP100	50	Sigma EP Primer	50	Sigmacover CM	75	Paracryl IFC	50	175	Two pack epoxy/catalysed acrylic
Marine										
Short Term	Galvit EP100	50	Sigma EP Primer	75	-	-	Paracryl IFC	50	125	Two pack epoxy/catalysed acrylic
Medium Term	Galvit EP100	50	Sigma EP Primer	75	-	-	Paracryl IFC	50	125	Two pack epoxy/catalysed acrylic
Long Term	Galvit EP100	50	Sigma EP Primer	50	Sigmacover CM	75	Paracryl IFC	50	175	Two pack epoxy/catalysed acrylic
Severe marine										
Short Term	Galvit EP100	50	Sigma EP Primer	50	Sigmacover CM	75	Paracryl IFC	50	175	Two pack epoxy/catalysed acrylic
Medium Term	Galvit EP100	50	Sigma EP Primer	50	Sigmacover CM	100	Paracryl IFC	50	200	Two pack epoxy/catalysed acrylic
Long Term	Galvit EP100	50	Sigma EP Primer	50	Sigmacover CM	150	Paracryl IFC	50	250	Two pack epoxy/catalysed acrylic

* Coatings generally not required for these atmospheric exposures - refer to the table on page 7 of this guide.

ONESTEEL MARKET MILLS
FOR MORE INFORMATION CONTACT

ONESTEEL DIRECT

39-45 Flagstaff Road Port Kembla NSW 2505

Locked Bag 8825 South Coast Mail Centre NSW 2521

Phone: 1800 1 STEEL (1800 1 78335) Fax: 1800 101 141

E-mail: onesteeldirect@onesteel.com

Website: www.onesteel.com

onesteel
market mills

PUBLIC
FILE 1